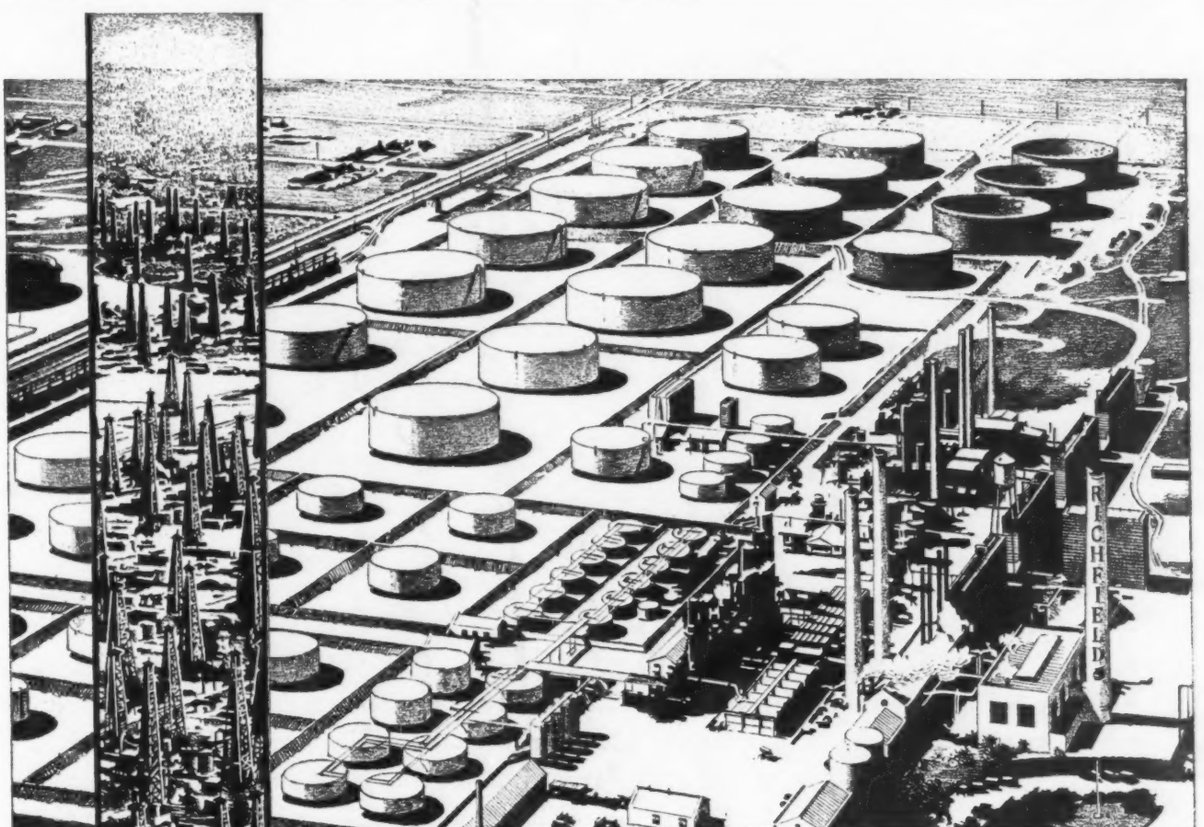
ELECTRICAL WEST

WITH WHICH IS CONSOLIDATED
THE JOURNAL OF ELECTRICITY

McGraw-Hill Co. of Calif. MARCH 1, 1932 Twenty-five Cents per Copy



For the

RICHFIELD OIL COMPANY

OF CALIFORNIA

The Receiver for the Richfield Oil Company of California, employed Stone & Webster Engineering Corporation to make an appraisal of the properties and to furnish a series of reports.

The reports were prepared as particular problems arose and covered specific questions upon which the Receiver needed technical opinion and advice.

The appraisal covered oil and gas pipe lines, compressor stations, pumping plants, refineries, marine terminals, and storage facilities—properties with a reproduction cost of over $44,000,000.

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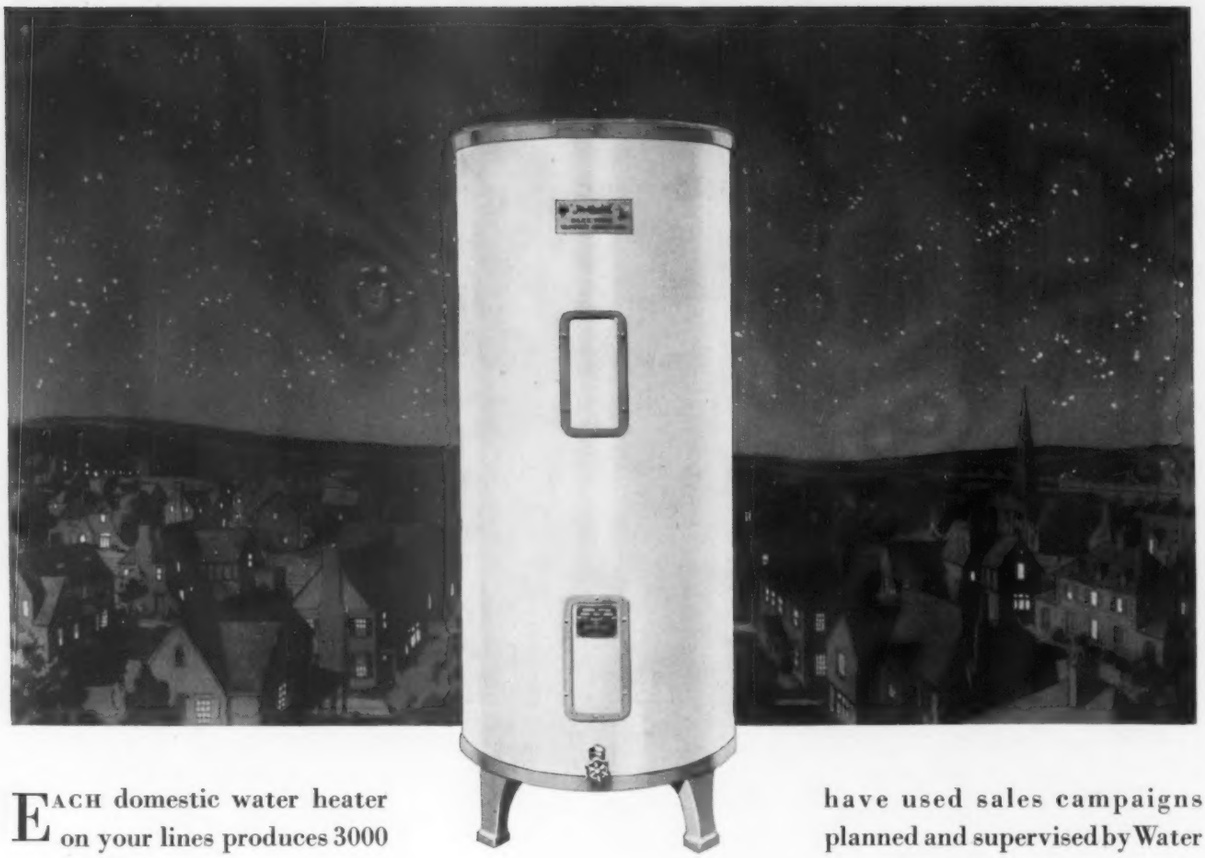

EACH domestic water heater on your lines produces 3000 to 4000 kilowatt hours per year —most of which are used *during your off-peak periods!*

It is evident, then, that the water heater presents a splendid opportunity to increase your revenue where it will do the most good. The General Electric Water Heater, largest selling domestic electric water heater on the market, is a load-builder that will fill up those valleys in your daily load graph—build goodwill and public confidence as well.

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WATER *Hotpoint* HEATER

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ELECTRICAL WEST, entered as second class matter at the post office at San Francisco, under the Act of Congress, March 3, 1879. Published at 883 Mission Street, San Francisco, California, thirteen times a year as follows: January 1, February 1, March 1, April 1, May 1, May 15, June 1, July 1, August 1, September 1, October 1, November 1, and December 1.

ELECTRICAL WEST

With which are consolidated the "Electrical Journal," the "Journal of Electricity, Power & Gas," and the "Journal of Electricity"

Established 1887
McGraw-Hill Company of California

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Volume 68 | San Francisco, March 1, 1932 | Number 3

McGraw-Hill Company of California

883 Mission Street
SAN FRANCISCO

NORTHWEST OFFICE
1206 Spalding Building
PORTLAND, OREGON

SOUTHWEST OFFICE
339 Chamber of Commerce Bldg.
LOS ANGELES, CALIF.

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ELECTRICAL WEST

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NEW YORK, 330 West 42nd Street
CHICAGO, 520 North Michigan Avenue
WASHINGTON, National Press Building
PHILADELPHIA, 1600 Arch Street
BOSTON, 1427 Statler Building
CLEVELAND, 501 Guardian Building
ST. LOUIS, 1556 Bell Telephone Building
DETROIT, 2-257 General Motors Building
GREENVILLE, S. C., 1303 Woodside Bldg.

Subscription rate in the United States and possessions, Mexico and all countries included in the U. S. Postal Union, $2 per year, two years $3; Canada, $2.50 per year, two years $4; elsewhere $3 gold (13 shillings), two years, $5. Single copy, 25 cents. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Member Audit Bureau of Circulations

Associated Business Papers, Inc.

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Dinner is ready...
Electric range cooks automatically for ½¢ a meal per person!
WHEN FRIENDS arrive for dinner, the hostess using an electric range is fresh and unruffled. She is attentive and charming. She knows the electric range is like having an obedient servant.
The electric range cooks automatically. Place the food in the oven, set the controls, and you can go care-free about other pursuits. When dinner time arrives, the food is cooked deliciously and ready to serve.
As for the cost of electric cooking, that averages but one cent a meal per person. New cooking elements are as fast as you'd want them. Then too, electric cooking is clean.
Let us show you the new electric ranges with their up-to-date improvements. Or stop in and see them at your dealer's.
PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned · Operated · Managed by Californians ·

Supporting the Electric Range Sales of Rural Dealers

While plans are being made for an extensive range campaign to start April, 1932, rural electric range dealers have an opportunity to increase sales.

The electric range advertisement, shown in a miniature reproduction here, is being published in rural towns and cities where electricity ONLY is served by this Company.

Since prospects are urged to visit their local dealers' stores, it should be worth your while to prepare an electric range window display in advance of the appearance of this advertisement. Your local newspaper will be glad to give you the exact publication date of this electric range advertisement.

It should also be worth your while to tie in an advertisement of your own with that sponsored by this Company. Tie-in advertising is used successfully by dealers, in both large and small cities, to increase their number of prospects and sales. Why not try it yourself, this month?

Your local newspaper will gladly cooperate with you in preparing your advertisement and publishing it in space adjoining that used by this Company.

PACIFIC GAS AND ELECTRIC COMPANY

P·G·and E·

Owned · Operated · Managed
by Californians ·

EW-103-332

MAR 14 1932 ©CIB 147447

ELECTRICAL WEST

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San Francisco, March 1, 1932
Volume 67
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G. C. TENNEY, *Editor*

Virtue—

REFUSING to be compromised by the questionable companionship of utility executives at its conventions, California's commission threatens to withdraw from the national utility commissioners' association if the latter does not tend strictly to its own knitting.

▼

Hoarding—

WITH surprising alacrity much sock-hidden money came out from under cover when a utility offered customer ownership stock, had it taken up in a few days, proving that all investors need is a safe place to put their nest-eggs to hatch.

▼

Political—

OREGONIANS, flushed with visions of public superpower, invoke the charm to bring Washington and Idaho into their dream network with the Columbia River as the energy source, the national government as fairy godmother, but still no market to pay the bills.

▼

SAN DIEGO voted its confidence in the private company which has earned its good will, refused the limit which politicians would have imposed on its franchise.

▼

LOS ANGELES water and power board refused to repay a loan urged returned by the mayor to aid unemployment relief because it must first satisfy a long-standing repressed desire for a steam plant, since the Edison standby contract terminates in May.

▼

SEATTLE'S bonds for the completion of Skagit tempt no buyers but do bring a surprising proposal from a large contractor.

The Month

NORTHWESTERN municipalities, once exuberent for municipal distribution to the extent even of condemning private systems, think better of it and grant franchises, withdrawing support to large city-plant surplus power distribution plans.

▼

Strong Medicine—

PRICE wars devastate both the just and the unjust, both buyer and seller, are a cowardly symptom of panic, can be cured only by spinal rigidity and abdominal strength.

▼

WHAT happens to noble experiments in merchandising? A new answer to Long Beach and Visalia, though perhaps not the complete or final one.

▼

IS THE manufacturer a good motor distributor in the dealer's field? A thoughtful inquiry into the matter of taking from Peter to pay Paul.

▼

Business Chances—

INTELLIGENT self-interest, solid doctrine, should enlist everyone in the industry in a plan to idealize the home by electricity.

▼

RENAME electric heat and win the gratitude of a name-bound industry as well as a substantial reward.

▼

AGAIN the promotional bureau, such as Spokane's, proves its ability to engineer its way into load and installation business.

Editorial

Caveat Emptor— Reverse English

LET'S face facts! Everyone is aware that an increasing number of transactions which no logical person would dignify under the name of business has grown out of the conditions associated with the two-year struggle for economic readjustment. These transactions, involving not only no profit for the seller but often an actual loss on labor, materials and overhead, are in reality nothing more than a painful form of business suicide. Ignorance, fear, desperate competitive conditions, or a combination of all three, have spread this mania for self-destruction among even the most conservative of business concerns.

Buyer and seller both are responsible for the mounting total of these profit-shorn, loss-entailing sales. Shortsighted buying, taking advantage of the present restricted sales outlets, has pitted competitors against each other; the resultant whittling, chiseling, gouging and back-biting forces prices on certain lines to figures which would be ridiculous if they were not so tragic. Panicky salesmanship has met the challenge of dwindling orders with price cutting so vicious as to spell bankruptcy to many concerns indulging in the practice.

Unfortunately, price seems to have become the only standard of purchasing. There is a vast difference between purchasing on an honest appraisal of value received and purchasing at figures wrung from harrassed salesmen because the buyer takes advantage of current conditions to seek a temporary gain. The former invites competition on the basis of quality; the latter on the basis of price. The former insures a continuous supply of reliable materials; the latter threatens the existence of an industry. The former provides the basis of profitable operations which is irrevocably linked with national prosperity; the latter strangles the interrelationship necessary for the normal functioning of our industrial structure.

To their everlasting credit, a number of concerns, among which are prominent Western utilities, have realized the consequences which will follow continued efforts to shave prices. Realizing that their prosperity depends upon the prosperity of all other branches of industry, that the quality of their products depends upon the quality of materials which go into their manufacture, these companies are encouraging bidders to demand a reasonable price for such materials by refusing to purchase at cutthroat prices. It may be that this ludicrous spectacle of the buyer endeavoring to raise the price to legitimate levels will force a modicum of sanity into the minds of those who believe that selling below cost is the panacea for business ills.

But these foresighted utility purchasing policies alone cannot stem the rising tide of "business at any price." Selling policies of concerns, many of whom have their very existence at stake, must be strengthened to conform with the fundamental business axiom that goods must be sold at cost plus a fair profit. This is not business ethics. This is not trade combination. It is the application of business logic and common sense.

With products of unquestioned value backed by the low production costs of efficient management, reputable concerns need only a policy of steadfast price courage to maintain their position in industry and to hasten business along the upgrade to normal operations.

Unfortunate "Experiments"

LONG BEACH and Visalia districts of California, according to a quite generally accepted idea, have been turned into an experimental laboratory for the testing of a theory that dealer merchandising is equal to or better than central-station merchandising. Both such an idea and the experiments themselves are among the things which the industry should class as extremely unfortunate. No matter with what care and pains the various steps of the experiment are performed, no one will ever be satisfied that just the right ingredients have been poured into the crucible by the "others" involved. At best, all that the experiments will prove is that human nature is human nature.

In the treatment of these two cases of central-station withdrawal from the field to allow merchants an opportunity to try their hands at electrical load building, ELECTRICAL WEST has striven to present what facts are available. After six months of operation the report of the merchants of Long Beach, stating their side of the case, was presented. Now comes from the Pacific Coast Electrical Bureau what is evidently another side. It is not complete in its details, but it does present a very serious aspect of a muddled situation. No sane appraisal, if such is at all possible, can ignore this damaging testimony. Even the staunchest supporters of dealer merchandising must face facts, unpleasant as they may be.

Loose and general statements relative to these two "experiments" are being spread throughout the country. On their faces any intelligent member of the electrical fraternity should be able to detect the too elaborate propaganda which marks this type of vocal effusion. If it may seem to any dealer that the stark statement of range sales in these territories given by the director of the P.C. E.B. does not do justice to the complete sales activities of dealers in these areas in the face of the economic situation, if they feel that range sales are not the proper index of success, it should be remembered that to central stations ranges are the primary measuring stick—a fact which the dealers appreciated when they asked the power company to withdraw.

There will be protests over these figures and their implications. There were protests over other reports upon or comments regarding the initiation of these "experiments." It was because the "experiments" themselves have been so charged with controversy, so potentially explosive in final results, that they were termed unfortunate by all friends of harmonious industry relationships, all believers in the efficacy of honest teamwork.

It would appear now that only the injection of a priceless and exceedingly rare ingredient in these times, mutual trust, will save the two nationally heralded "experiments" in merchandising from going sour, and by their frothing overflow, producing stains which it may take years to eradicate.

Mutiny and Civil Strife

MORE wars, it has been said by penetrating historians, have been lost because of mutiny than because of inferior strategy or man power. While the distribution of goods is a constructive campaign directed at consumers, and hence is no war, it is a sad commentary on this campaign that those who are engaged in it too often are at war among themselves. In the present economic tension, even many of the old hatchets, buried with jubilant ceremony, have been dug up, rusty and worm-eaten as they are.

As if the general financial stringency were not enough, the days and nights of the industry are filled with reports of withdrawals from national associations or commercial movements, the dismemberment of intra-industry cooperative organizations and works, and the drawing apart of certain branches or companies of the industry to follow programs of their own. Shot through it all are corps of expensive men doing nothing else but running around to see what competitors or other branches of the industry are doing and trying to keep them from doing it.

Meanwhile everything stops and waits. For what? For intelligent direction and the application of some of this wasted energy actually to move the load to market.

Even now there are a number of excellent sales plans either ready to be launched or in the final processes of organization. The forward-looking men and women who have kept their eyes upon the real objective—the market—and have devised these means to bring the industry to that goal, deserve commendation and support, not bickering delays, wasteful impeding resistance and reaction. Theirs is a constructive tendency; theirs is a beneficial and nearly always an unselfish creation, conceived because they wish to move on to better opportunities for still more original effort.

Waterlogged by inertia, cautious and suspicious because hard pressed, easily frightened by shadows, the industry in all its branches and among all its individuals is too close to the verge of panic to tolerate scandalmongering and busybody whispering at a time like this. When energetic groups with definite programs of a constructive nature are made to become ultraconservative and cautious, and hence inoperative, when attention must be diverted from selling and upbuilding to answer charges and innuendos, when squeamishness over possible effects on personal interests outweighs public interest, it is high time that the sane and sensible in the industry call upon all of us to adjust our sense of proportion and keep our eyes on the main problem —*selling.*

As illustrated in an excellent program dedicated to "everyone's self-interest" described in this issue, the industry is so interrelated that the benefits which accrue to any one branch or any one self-interest cannot help but redound to the benefit of all the others, whether they like it or not. What if a few toes are trod upon in the grand rush for real business? Certainly the acquisition of the business will justify the momentary stab of pain and may even provide corn cure more ameliorating than all the careful nursing and babying in the world.

Let the industry keep its eyes on its objective—electrification of home, factory, office and farm. Let it not be diverted in its purpose by the dissipating, devitalizing, destructive forces of gossip, suspicion, fear and short-sighted selfishness. There is too much at stake to clog the machinery with internal debris, the sabotage of civil strife and mutiny in the ranks.

Who Pays the Reparations For Price Wars?

By E. F. WATKINS*
Manager of Purchases and Stores,
Southern California Edison Co. Ltd.

The Buyer, Answers the Author—Proving That Sometimes It Is Not Smart to Be Thrifty, Because Below-Cost Purchases From a Panic-Stricken Seller Destroy the Best Source of Future Supply

THE buyer who, in a time like this, scuttles the seller's ship for an immediate price advantage, may by that very act contribute toward destroying his own best source for future supply.

The seller who, in a time of flush business activity, over-reaches the bounds of legitimate price demand, is by that very act destroying the faith and confidence which may hold him the support of valuable customers during lean times.

The principle involved has nothing to do with cant or sentimentality. It is neither a preachment nor a vague theory for moralists. There is nothing about the subject that suggests any "holier than thou" atmosphere. We need not raise the eyebrow, nudge our neighbor, or wink across the table at a suggestion which imposes upon each of us the obligation to deal in business fairly, justly, and with understanding consideration. It is just plain, good, sound business.

No one would want to entertain in his home a confirmed communist dynamiter whose sworn purpose was known to be one of ruthless destruction. Anyone with common sense would take steps to prevent such a situation by any means within his power. Still, we go along complacently accepting the confirmed business dynamiter within the bosom of our business family; we palliate his acts of destruction, wink at his breaches of business etiquette and playfully excuse them as "eccentricities."

These fellows, to all outward appearance, are busy enough, but they are busy to no permanent good. They are either incapable of, or indifferent to, the need for analytical thinking. Proposed methods and practices which are best calculated to improve and build up an industry as such in order that each unit thereof may share proportionately in such betterments, do not appeal to them because it takes thinking to arrive at that viewpoint. They are too busy grasping at short-sighted expedients from day to day to understand this language. I am not so naive as to think that there is much to be accomplished by talking to such men, but if frequent reiteration and emphasis is worth anything, it may serve to encourage the branding of avarice, unbridled selfishness, and ignorance of sound business practice for the destructive influences they really are, and label the confirmed perpetrators once and for all so that they may not occupy that position of smug acceptance which is too often conceded them.

It must be apparent to every business man, especially if his books are closed for 1931 operation, that to continue to sell on a basis which fails to cover a proper overhead burden, plus a reasonable profit, can lead only to disaster.

This is all elementally true. You listen to speakers, even orate yourselves, write articles and adopt resolutions against profitless sellers and chiseling buyers, and then go right ahead yourselves gouging and chiseling with such vigor that there is hardly a man or an industry left untainted with some phase of this mania for self-destruction.

You know quite as well as I do that many of the current methods and practices are lowering standards of business conduct, extinguishing ethical considerations, and turning honorable business competition into a sanguinary, ruthless and vicious conflict. Libel, falsehood, piracy, deceit, even plain banditry are growing into the practices of every-day dealings to an extent that is little short of appalling. And the worst part of this situation, as I observe the tendency, is the concurrent weakening of moral fiber which should impel men with purpose and determination to draw a dead-line in principle beyond which no temporizing or inducement of expediency will tempt them to step.

The word "sabotage" suggests to us circumstances and individuals hideous in the extreme, and outside the pale of any decent human relationships. We brand the bomb-throwers for what they are because of their overt acts; we recognize them as enemies of our social order; they offend our sense of right and threaten our very security and thus reduce their effectiveness for greater harm. I cannot see that the overt act of the bomb-thrower, the methods employed by the gangsters and racketeers, are any more lawless or destructive than some of the methods and practices which are being employed today in business and in politics by men who like to consider themselves decent citizens and are still accorded recognition as such—sometimes even by the victims who have suffered at their hands. We will learn to

*From an address delivered last month before the Iron, Steel and Allied Industries Group of the California State Chamber of Commerce.

brand such as outcasts and thus reduce their effectiveness for harm only by developing a public opinion intolerant of unmoral and rascally behavior.

I am authorized to speak as the representative of organized purchasing, of the purchasing profession, and to express the deep concern we feel in witnessing the drift toward chaos in the thinking processes of so many men. We, individually as well as through our national and local organizations, are trying to keep our feet on solid ground; to be guided by reason and common sense; and by doing so to lend a steadying hand.

Contrary to the statements of uninformed commentators, we have a vast amount of competent testimony to substantiate the fact that the purchasing profession as a class, under the leadership of an executive type of broad-visioned men, deplore the present conditions of trade and industry with a very clear understanding. We have plenty of occasion daily to cope with the wildest, most frantic situations that truly seem to verge on insanity. We might expect rash things to happen with illy equipped shoe-string operators, forced into conversion of goods for cash to meet urgent obligations.

But when large national concerns go panicky with the rest, throw all discretion to the winds, and offer merchandise at material and labor cost or less in order to make a sale, the situation has become amazing. We, as buyers, are generally helpless to cope with it. We can and do express disgust and disapproval and counsel against such foolishness, but in the end the competitive conditions of trade, the practices of bidding, the insistence of the bidders, usually force us into compliance with the system.

The subject of price regulation, by whatever means may be employed to produce uniform quotations from all biddders on a given article, sends some of my cofreres in the purchasing profession into convulsions. I cannot work up any convulsions on this score if the conditions of control in a given case are honestly justifiable and the price is fair. I am more likely to convulse at finding that somebody broke down along the line and gave an extra five to somebody *"by mistake."*

Price control and price regulation, however, contain within themselves complicated, far-reaching and dangerous elements which in the final analysis may produce results not possible to anticipate at the time of their formation. We may divide the subject of price regulation into two classes: that type existing under the control of government, and that type existing by the consent of a group but without governmental authority.

Governmental price control may be inspired by an effort to benefit basic production and industry, but it usually gets out of hand with bad results. We are now in a position to look back upon many instances of wreckage and catastrophe which are a sad commentary on realization of the hopes and good intentions out of which they grew. I refer to such instances as the stimulation to surpluses resulting from twenty years of governmental control of coffee; seven years in rubber; ten years in silk; five years in sugar.

The trend toward government in business raises a spectre which casts its shadow far and wide; it stifles the initiative of trade agencies; it dulls realization of our individual responsibilities; it weakens purpose to assume leadership, to overcome obstacles and clear the way for advance. As soon as we, as individuals, allow our judgment to become befogged, so forgetting fundamentals that we run to government to fix and regulate our affairs, we are departing from the only road which leads to achievement of American ideals; we are exchanging our birthright of independence in thought and character for a blighted mess repugnant to the American soul.

As to the type of price control represented by association agreements, manufacturers' resale price control, and so forth, there is much that can be said for and against such price regulation or whatever you may wish to call it. Some of the results, however, such as pegging of copper at eighteen cents for a full year while stocks above ground were increasing and demand decreasing, illustrate the unsoundness and danger involved in such programs. The present-day condition of the copper industry is a sermon in itself on the subject of flaunting the law of supply and demand.

I find nothing to get excited about, however, in such control, for instance, as the resale price of merchant pipe by the tube mills so long as the schedule is fairly and honestly maintained.

Organized purchasing's contribution to basic sanity is being directed toward building up a strong bond of mutual interest, of friendly confidence in our relationships with the men we do business with. We take a live and active interest in their problems and their success just as we find they take in our problems and our success. This spirit of intelligent understanding is being cultivated and is growing in this nation of ours. We intend that it shall continue to grow until it extinguishes the traditional antagonisms which were assumed to exist as a natural barrier between buyer and seller.

We can get no gratification out of any transaction with a worthy, capable, friendly supplier which will result in injury and loss to him. We are not always able to pull him out of the bog, but at least we are not going to push him in deeper. When we have risen to the capacity of vision to regard business in its broad relationships, we grow away from and lose patience with the petty practices and meanness which remain the stock in trade of many who are playing at business.

John D. Rockefeller, Sr., is quoted as having made the following reply to a question as to how he managed to make so many decisions that turned out so wisely: "We never deceive ourselves;" and he repeated it, "We never deceive ourselves." It is a valuable suggestion; very potent of benefit for all of us. I am often conscious of wrong judgments, too hasty conclusions, and consequent error because I deceive myself through laziness or plain carelessness in accepting impressions without verifying facts.

My own company is deeply interested in every worthy project which will contribute toward the successful and profitable operation of every industry and business. Our growth, prosperity and improved ability to serve is inextricably interwoven with their development and their success. They are all more or less dependent for success upon the profitable operation of the others.

I appeal most urgently to the stamina and character of every business man to assert himself in no uncertain terms. Call a spade a spade, and brand it as such, so that he who runs may read. We have had our fill of trick hypocrisy, business crooks, demagogic quackery, plain unvarnished lying and deceit, and a full measure

of various brands of damn foolishness to muddle our brains and clog our way, and we have suffered it long enough.

I urge you to cease looking for a "Moses" to lead you out of your difficulties. I urge you to cease leaning on the weak reed of governmental agencies to solve your problems. Take matters in your own hands; know the facts; face them with courage and determination; clean house right down to the cellar and burn the rubbish.

Do not deceive yourselves by temporizing with principles, but know your costs and base your prices on known costs, plus proper burden, plus reasonable and legitimate profit, and sell yourselves and your goods on honest worth, dependable service, and in a spirit of complete community of interest with the customer's welfare. I can assure you that the leaders in the purchasing profession today place these qualifications ahead of price in establishing permanent sources of supply. We are not happy over the confusion and irresponsibility which forces us now at times to place orders where they are not earned.

Repeating Mr. Rockefeller again, "We never deceive ourselves." Let no one of us deceive himself by clinging to the idea that some time, somehow, if he can hang on long enough, he will manage to get back into the old stride in the old way and everything will be rosy again. Success for the future is going to come only to those who have the intelligence to analyze now the conditions and trends of the times, to develop the facts, then to face those facts fairly and squarely and with courage and energy map out a new course.

The present chaos in commodity prices, the wholesale scrapping of pre-conceived notions as to manufacturing and distribution methods and practices, is of course painful and upsetting to all of us. The present condition of extreme deflation has brought the selling price down much in advance of and much more rapidly than it has production costs. This condition is on top of us; it is widespread; and it is not going to be improved by weeping, by orations or by the wand of magic.

Our job is to clean house, reduce costs down below any levels we ever dreamed were possible. This can be done, has been done, and is being done, and the men who are doing it have sense enough to refuse to join the lunatics. They keep clear of sales which do not carry a profit in addition to burden. The management of such concerns will not tolerate any salesmen with the price complex.

The responsibility for our present disorder rests to some extent on each one of us individually. We have not failed because of ignorance of economic law so much as because of utter disregard and defiance of sound principles. We have shut our eyes to the dictates of reason and common sense and let cupidity and greed dictate our policies. What we need is courage to face facts, character to stand by sound principles, a militant personal honor in our dealings, a keener sense of individual responsibility in our human relationships. The machinery for reconstruction will grow out of this.

Nature As Well As New Loads Influences Utility Investments

OPTIMISTICALLY pointing to certain uncontrollable factors influencing the figures in the article "Not Just Load but the *Right* Load" in the January issue of ELECTRICAL WEST (page 4), the author of the following letter holds that investments in generators and related equipment, which seem higher than necessary in the light of load demands, are wise investments in policy and futures. He says:

"The article . . . . gives very interesting and instructive data on what has been accomplished in load building during the past few years and I quite agree with all the author says. However, I feel it quite unfortunate that the author does not point out several good and important reasons why investment (both total investment and that for generators alone) has run ahead of power sales. As the figures stand, without explanation, the showing is discouraging to all of us who have confidence in our profession. If certain facts in the situation are properly taken into consideration, however, these figures really become encouraging.

"With reference to investment in generators: We have ample and unavoidable reason for the present excess in generator capacity in the three or four years of exceptional drought recently experienced. Neither engineers nor officials had reason to anticipate such a temporary falling off in hydraulic power. When it occurred, there was nothing to do but to assume that it would occur again and to greatly increase the percentage of steam driven generators. If, in the calculations, the effective power that could be taken from hydraulic stations had been used instead of their designed capacity, results more nearly correct would have been obtained.

"The figures given are the facts, of course, but Nature and not man was responsible for the poor showing during the past few years. Consequently, we can have more courage for the future, knowing that Nature moves in cycles.

"Another important consideration is that, in response to public demand, power companies kept up their usual rate of expansion in the face of a let-up in their demand as a contribution to the effort to overcome the business depression.

"Again, as the author mentions but might more strongly stress, a very considerable part of recent investments has been in duplicating lines and in providing relays and switches, all to obtain the greater reliability of operation now so essential. Almost everything industrial or domestic, is dependent absolutely on the continuous supply of electric power.

"Tie-in transformers, contributing to this same end, have been installed in many places. Eventually, these will be a good investment in saving generator capacity, but operating companies have not always learned how to exchange peaks through such connection and in some cases they do not need to learn under present demand conditions.

"To summarize briefly: Much of the necessary investment of the past few years is, just now, poor investment from the standpoint of increased return, but it will be good investment soon after the return to normal business conditions."

WALTER S. MOODY

Pittsfield, Mass.

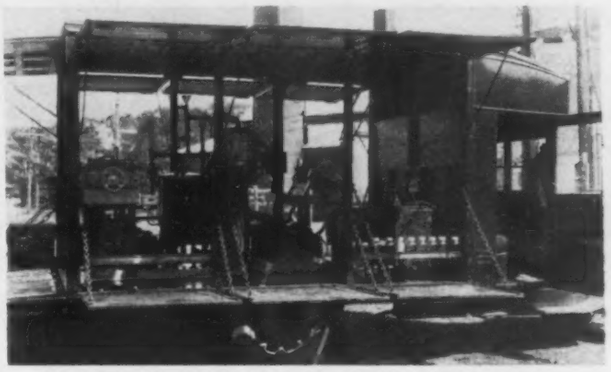
Mobile Plant Insures Safe Insulating Oil

By GEORGE C. STODDARD
DeLaval Pacific Co., San Francisco

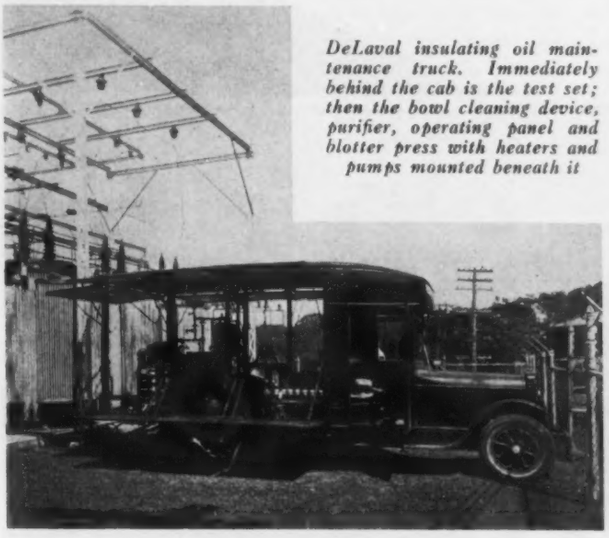
TO DEMONSTRATE a satisfactory method of supplying a long recognized need of modern operating practice, the DeLaval Separator Co. has designed and built a portable oil purifying equipment for the purpose of maintaining the dielectric qualities of the insulating oil used in electrical apparatus which is without access to the usual oil-equipment apparatus. The transformers and circuit breakers of isolated substations are examples of installations which require periodic service of this kind and, economic factors prohibiting the use of individual purifying equipment, they have taxed the ingenuity of operating departments in providing this maintenance economically. Investigation of this problem led to the construction of an outfit to demonstrate the practicability of the recommendations for its solution.

As speed and portability were two factors which controlled the investment cost per unit of oil treated, a two-ton, high-speed truck of standard make was selected as the vehicle on which to mount the apparatus. The oil purification equipment consists of a No. 700 DeLaval portable insulating oil purifier complete with blotter press, conservator attachments and four-speed pump, a Hynes blotting paper drying oven with thermostatic control, and a standard General Electric portable testing unit. While the condition of the oil determines the capacity of the apparatus, oil which broke down at 15 kv. was purified and dehydrated to meet dielectric requirements of over 30 kv. at the rate of 1,200 gal. per hour at a temperature of 85 deg. F. with the equipment stated. Portable features were removed from the individual pieces of apparatus and the complete unit, assembled as for ordinary portable service, was bolted to the floor of the truck. The oil inlet and outlet are piped through the floor to connections under the rear of the body. Electrical connections are also made at this point by means of a circuit breaking plug. One hundred and twenty feet of 1½-in. Goodrich No. 500 gasoline hose in 10-ft. lengths and 60 ft. of three-conductor cable are carried as part of the apparatus to facilitate making oil connections to the apparatus and electrical connections to power sources.

By a special design of the truck body, additional working space is provided, the body paneling being split at the horizontal center line so that the lower panels may be dropped to form a platform around the sides of the truck which is protected by the roof formed when the upper panels are raised to the positions shown in the accompanying photographs. While this feature facilitates working around the equipment, in inclement weather the sides need not be opened as sufficient room is provided for satisfactory operation within the truck itself. Inside dimensions are: length, 11 ft.; width, 6 ft. 6 in.; height, 6 ft. 6 in. A bullhead extending over the cab is equipped with doors opening from the purifier compartment, giving ample locker room space. Two dome lights provide ample illumination for operating the equipment when the sides of the truck are closed.



Conditioning insulating oil at small substations becomes routine task with truck-mounted plant. Note simple method of making oil connections at rear of truck



DeLaval insulating oil maintenance truck. Immediately behind the cab is the test set; then the bowl cleaning device, purifier, operating panel and blotter press with heaters and pumps mounted beneath it

During the eleven months that this truck has been in service, it has been sent through 24 Eastern states demonstrating its utility to various power companies. Representing the most modern ideas of oil maintenance equipment, the truck with its associated apparatus fulfills the need of a compact, portable oil purifying plant. Although primarily designed to handle insulating oils, it has successfully treated lubricating oils in both industrial and utility plants. For the peculiar geographical conditions in the eleven Western states, requiring power systems covering large areas with a relatively large proportion of isolated substations, an equipment such as described above would offer adequate protection against apparatus failures due to decreased qualities of insulating oils at a low investment and operating cost.

Ariel Project Engineered For Economic System Operation

Conditions Permitting the Installation of Relatively Low Cost Capacity, It Was Desirable to Provide for Maximum Low Load Factor and Emergency Operation in This Plant Because of Its Proximity to Portland. One 45,000-Kw. Unit Comprises the Initial Installation of This 180,000-Kw. Development

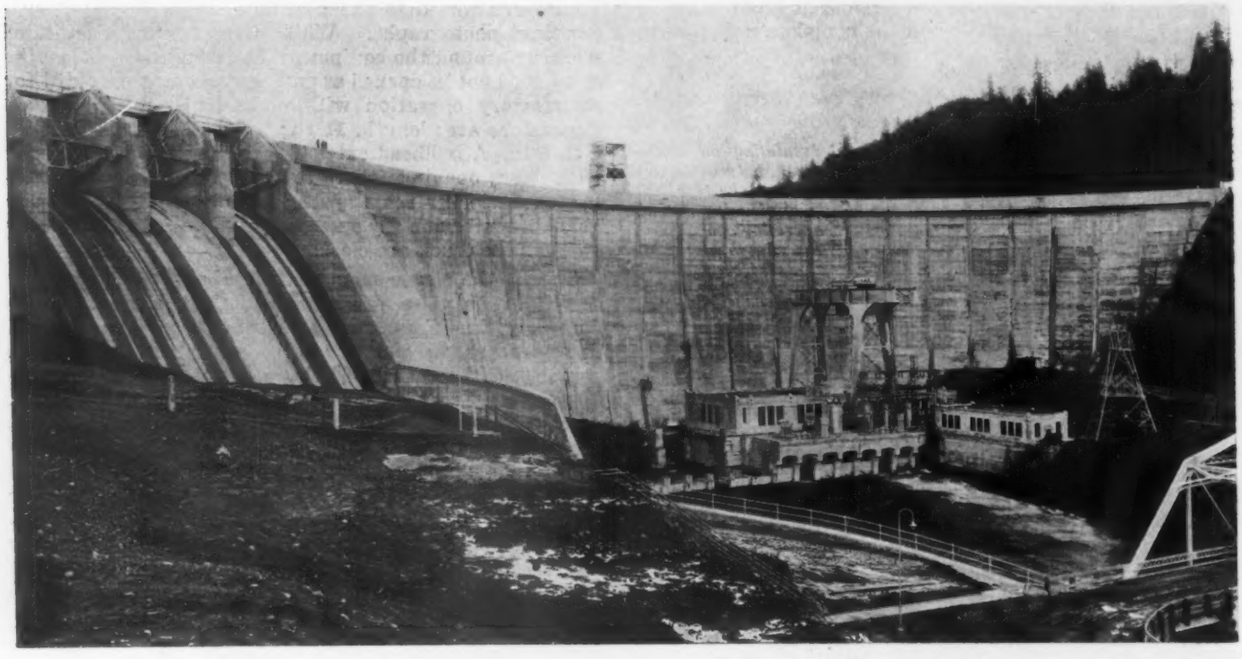
By A. C. CLOGHER *and* W. S. MERRILL
Engineering Department
Electric Bond and Share Company

THE Ariel hydro-electric development of the Inland Power & Light Company is located in Washington on the north fork of the Lewis River about 25 miles north of Portland, Oregon. The initial installation consists of one 45,000-kw. unit, but the plant is designed for and has been partially constructed for an ultimate installed generating capacity of 180,000 kw. This plant will make large additional capacity available to the following interconnected and associated companies: Pacific Power & Light Co., Northwestern Electric Co., and The Washington Water Power Co., which in turn serve extensive portions of the states of Washington and Oregon and a portion of western Idaho. With Ariel, the present generating capacity of the foregoing and affiliated companies has been increased to approximately 240,000 kw.

The Lewis River rises as a glacial stream, its tributaries originating at the bases of Mt. Adams and Mt. St. Helens. This plant is the initial power development on the Lewis River and is located at the lowest point on the river where such a project could be advantageously developed. The Yale site, situated at the head of the Ariel reservoir, probably will be the second project to be developed. The drainage area at Ariel is 733 sq. mi. The reservoir has a surface area of 3,850 acres and stores 400,000 acre-ft. of water, of which 220,000 acre-ft. is in the upper 65 ft.

The present installation of one 45,000-kw. unit is designed for a rated head of 170 ft., but will have a maximum head of 185 ft. with the reservoir full. The power house has been completed for a second unit of the same size, and a portion of the substructure below normal tailwater for four units. This large ultimate capacity has been provided for because of the fact that additional power developments and storage reservoirs upstream on the Lewis River will eventually greatly increase the primary power available at Ariel and also because of the fact that the

Advantages of the combined outdoor and indoor construction of the plant are illustrated in this view of Ariel dam and power house



storage available and the proximity of the plant to the cities of Portland and Vancouver make it desirable to provide for low load factor operation and emergency capacity, which can be installed relatively cheaply in this plant.

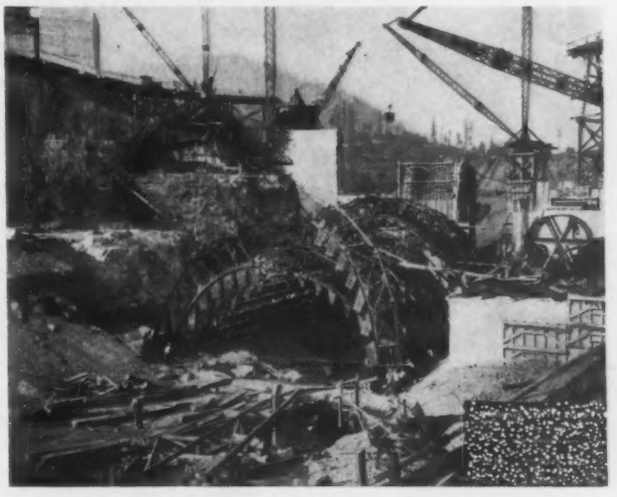
The Ariel dam and power house have been built in an ancient box canyon. The geological formation is of volcanic origin, the rock consisting of layers of andesite and basalt lava. These beds were tipped subsequent to their laying down so that they now dip at an angle of 20 to 30 deg. across the river. It appears that they have been down-faulted, as evidenced by the fact that a deeply eroded channel was found 73 ft. below sea level. The source of the material for these lava flows is not hard to imagine when one gazes upon the surrounding country and sees the numerous old volcanic cones now covered with ice and snow and rising from 9,000 to 14,000 ft. above sea level. The principal cones in this section of the country are Mt. Adams, Mt. Hood and Mt. St. Helens, with Mt. Rainier somewhat farther north.

A topographic survey of the Ariel reservoir was made in 1929 by aero-photography by Brock and Weymouth of Philadelphia. The site for the power house and dam was thoroughly investigated by diamond drilling which was mostly completed previous to Nov. 1, 1929, although some drilling was done after that date. The earlier drilling was done along lines 100 ft. apart at right angles to the river, yielding geological cross-sections of the canyon both upstream and downstream of the preliminary dam location. After the original drilling had been completed it was found that the yardage in the dam could be greatly reduced by moving it upstream about 125 ft. at the left, or south end. The later drilling, during the early part of the construction work, was to prove up the area under the dam in more detail. The early investigations of the site indicated that a great depth of loose material would be found in the stream bed overlying the bed rock.

When the final location of the dam had been decided upon, several drill holes were put down on both sides of the river, so inclined that they would intersect or pass each other in the solid rock under the river bed. The diamond drilling developed the fact that the solid rock under the lowest part of the arch dam was 73 ft. below sea level or about 125 ft. below the normal surface of the river at low water. In addition to the extensive drilling program described, a considerable number of trenches and tunnels were used in exploring the side hills above the river bed. The region immediately north of the north abutment of the arch was explored by geophysical methods to complete the geological map. This work was done by Schlumberger Electrical Prospecting Methods, which had previously done a considerable amount of this kind of work both in this country and Canada. As a result of this investigation it was found that the stream originally flowed farther to the north than its present location, the old stream bed being filled with a rather firmly packed mixture of sand, gravel, boulders and silt. Thorough testing of this area by shafts and tunnels indicated that leakage through it probably would be slight. This area required only a very low earth dyke to bring it up to the proper level to retain the water in the reservior. The total amount of diamond drilling at the Ariel site amounted to approximately 25,000 linear ft. and was done by Lynch Bros., of Seattle. The early drilling work was done under the direction of Lyman Griswold, consulting engineer of the Northwestern Electric Co. Ira A. Williams, of Portland, was consulting geologist.

Solid rock was found on the south or left end of the dam to a sufficient height for a good abutment. At the right abutment the rock extended to only a portion of the required height, being some 140 ft. below the crest of the arch. Although the site was not ideal for an arch dam, it was fairly suitable, the arch type allowing a large saving in concrete to be made.

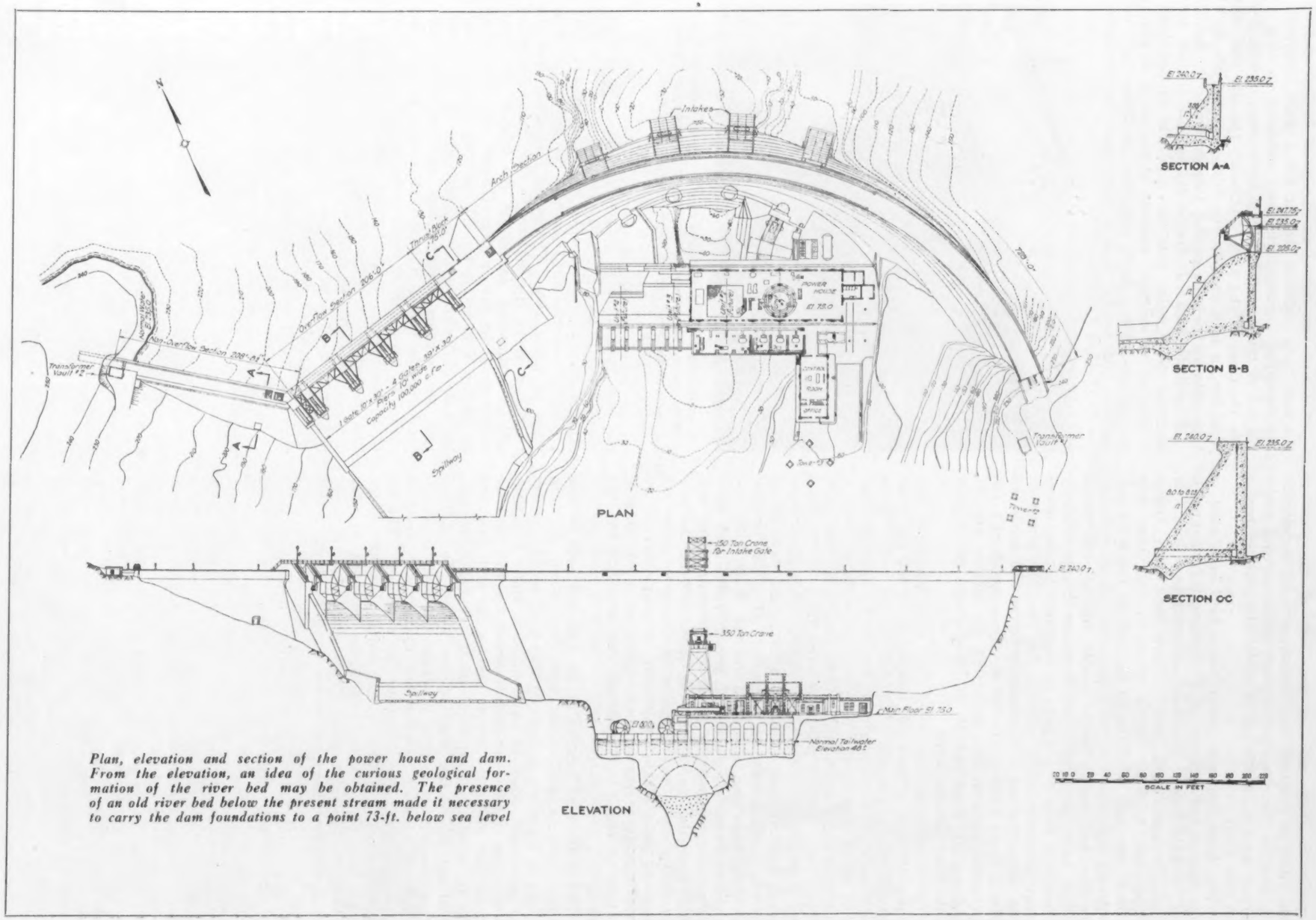
It was decided that the most feasible method for handling flood water past the dam was to discharge it through an artificial spillway at the north or right end of the arch. Solid rock was available for this purpose and several studies were made to determine



Construction view of the steel false work for concrete arch which carries the weight of the central portion of the power house, each end of which rests on solid rock

the best method to be followed. The scheme finally adopted was to pass the water over an overflow section of dam through tainter gates on its crest and down a sloping concrete-lined channel protected by high walls on either side. The water discharges into the river just above the highway bridge below the plant and in a direction parallel to the flow of the river. Exact layout of the spillway channel was determined by testing a model in the laboratory of the Carnegie Institute of Technology, Pittsburgh, Pa. It was found that the scheme adopted was entirely satisfactory providing the wall at the left side of the spillway was curved to the north or right so as to cause the water to be discharged into the river parallel to its flow. The test of the model indicated that large quantities of sand and gravel would be removed from the stream bed at the end of the spillway and deposited elsewhere in the river above or below, depending upon the layout. The finally adopted scheme, with the curved wall, caused the material to be carried downstream and also kept the elevation of the water next to the power house to the minimum possible level.

The overflow section of the dam was designed to pass a flood of 100,000 sec.-ft., which was more than 50 per cent larger than the 63,000 sec.-ft. flood of record. The ordinary flow of the river varies from a minimum of 800 sec.-ft. to 30,000 sec.-ft. The crest of the overflow section is provided with tainter gates 30 ft. high, four being 39 ft. long and the fifth 10 ft. long. Each gate is handled separately by motor- driven sprocket-wheel hoists. One of the gates is arranged for remote control, the others being operated locally. The gates and hoists were furnished by the Willamette Iron and Steel Works, of Portland.



Plan, elevation and section of the power house and dam. From the elevation, an idea of the curious geological formation of the river bed may be obtained. The presence of an old river bed below the present stream made it necessary to carry the dam foundations to a point 73-ft. below sea level

The thrust block has a maximum height of 140 ft. and is a very heavy section to take the thrust, shear and twisting effect of the north end of the arch above the natural rock. This section has one vertical construction joint which was thoroughly grouted just before the reservoir was filled and after the concrete had had a number of months to cool and shrink. The overflow section of the dam is an extension of the thrust block and was built with construction joints between the piers, which were grouted previous to filling the reservoir and after the concrete had cooled and shrunk for nearly a year. The grouting of the construction joints in the thrust block and overflow sections of the dam was done through 1-in. pipes placed horizontally every 5 ft. in elevation, and having side outlets to electrical conduit boxes with open faces placed against the old concrete in the keyways. Shrinkage of the concrete was sufficient to allow some grout to be forced in along most of these joints. The grouting of all of the joints to the end of the overflow section provided a large mass of concrete, in addition to the thrust block, to take the thrust of the arch.

Dam Construction Details

Copper seals were provided near the upstream face of the gravity sections of the dam at each construction joint, and plate steel seals were placed in the horizontal day's work joints, near the upstream face. Pieces of Celotex 4 in. wide were built up to 4-in. thickness and carried up vertically at intervals from the inspection gallery in the thrust block and overflow section of the dam. The Celotex was later wet and removed, leaving 4-in. square openings. Half tiles were placed between these vertical openings to catch any water that might get into the horizontal construction joints from the upstream face of the dam. Some of these openings have shown a small drip, but none of them have carried any amount of water. The rock at the upstream heel of the thrust block, overflow and non-overflow sections was grouted through holes drilled 20 ft. or more deep on 10-ft. centers. After completion of this grouting, drainage wells were drilled into the rock on 10-ft. centers, from the inspection gallery.

The arch section of the dam is a variable radius arch designed by the "trial load" method. This method has been used by the U. S. Bureau of Reclamation in the design and checking of several large arched gravity dams and has also been used by the Salt River Valley Water Users' Assn. in the design of several arch dams. Experience with this method in the design of the Ariel dam has enabled it to be somewhat further simplified, making its application to future cases less burdensome. This method is now being used in the design of the Flathead dam for the Montana Power Company. The allowance for temperature varied according to the thickness of the concrete. The compressive concrete stress adopted was 600 lb. per sq. in., this being exceeded slightly in the final design at only two or three spots. All arch and cantilever stresses were computed as compression, no allowance being made for the tensile strength of the concrete. Allowance was made for 50 per cent uplift at the upstream side of the arch, this decreasing to 50 per cent of the tailwater head at the downstream side. The heel of the arch was grouted in a manner similar to that used for the gravity sections.

The arch was built in blocks about 30 ft. long at the upstream face with 2-ft. slots between. In that section back of the power house where the 15½-ft. penstocks come through, the blocks were longer, being about 38 ft. on the upstream face. From El.—73 to El.—30 the concrete was placed monolithically. From El. —30 to El. 0 the concrete was placed with vertical construction joints provided with pipes and conduit outlets for grouting. Above El. 0 the 2-ft. slots were left for the whole length of the arch except in the three blocks left low for passing floods. The slots ran practically radially through the arch at all elevations.

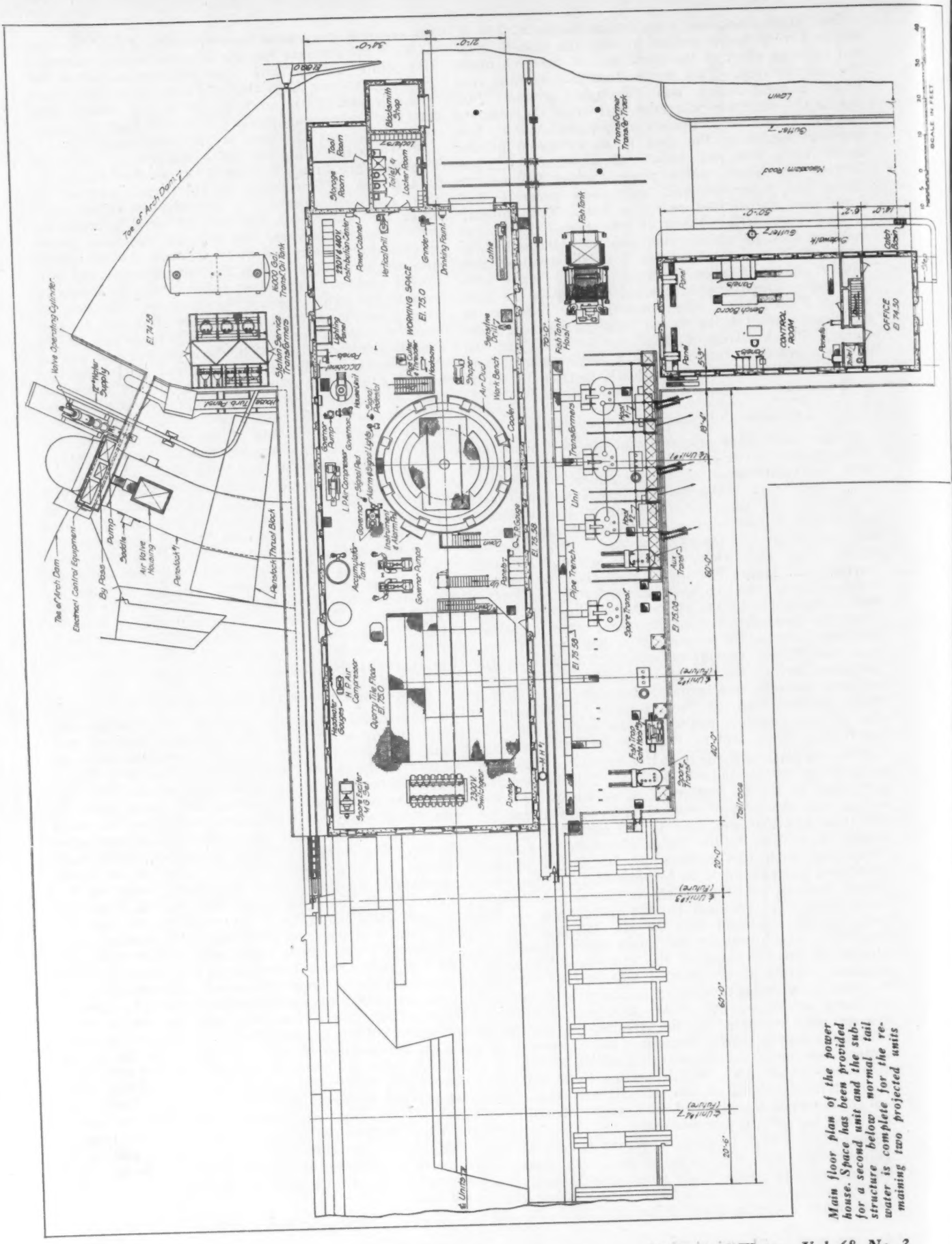
Previous to closing the cofferdams and diverting the river into the tunnel in June, 1930, some of the gravel in the area to be occupied by the deepest part of the arch had been removed by derricks on either bank. After the water was diverted the area between the cofferdams was pumped out and the remaining gravel removed by five air- and diesel-operated shovels loading into tractor trucks. From the very deepest and narrowest portion of the river removal was by means of hand-loaded skips removed by derricks. As the fall floods could be expected at any time after Oct. 15, provision was made for removing the greater part of the 196,000 yards of material in the river bed and placing 46,000 yards of concrete to bring the arch above the normal river level before that time so that concreting could be continued even if floods did come and over-top the cofferdams. The arch blocks on the south bank of the river were being built at the same time and were well along by the time the concrete in the deep part of the arch had reached normal river level.

Concrete was placed by means of Wiley Whirleys located on top of the blocks, and in some cases by means of derricks. The concrete was brought from the mixing plant in two-yard bottom dump buckets, which were placed directly over the spot to be occupied by the concrete. Three of the blocks near the north end of the power house were left low to pass the floods that could be expected through the winter season. Fortunately no large floods occurred until the dam was nearly completed. An estimated flood of 50,000 sec.ft. in April, 1931, raised the reservoir to El. 118, discharging approximately 26,000 sec.-ft. through the tunnel.

Thermo-couples Imbedded in Dam

To determine how the concrete temperature rose after placing of the concrete and how it reduced with time, about 300 resistance type thermometers were embedded in the thrust block and in various arch blocks. Most of these thermometers worked satisfactorily and about three-fourths of them are still being read. It was found that the interior concrete raised as much as 70 deg. F. within the first eight or nine days after placing. The decrease in temperature was fairly rapid for the first two or three months, after which it was considerably slower. As an experiment, several of the earlier blocks were provided with vertical openings through which water from the reservoir was pumped. One block was provided with one 12-in. vertical pipe, another with two 10-in. pipes, and another with several 5-in. holes formed by raising 5-in. hollow rubber conduits as the concrete was placed. The cooling effect of the water in these openings was considerable, even in the one 12-in. hole. With more holes the cooling effect was more, but not in proportion to the area of the holes nor to the amount of water pumped. In the spring of 1931 when the three blocks left low for the floods were built, they were carried up quite rapidly without leaving the usual slots between them. Their temperature rise was kept down considerably by means of 20 to 25 5-in. holes formed by rubber conduits in each block. In addition to the internal cooling of some of the blocks, all of the concrete was sprinkled to assist in cooling and to prevent checking and cracking.

The arch blocks were provided with vertical key-



Main floor plan of the power house. Space has been provided for a second unit and the substructure below normal tail water is complete for the remaining two projected units

ways at each end, these keyways being 6 in. deep and 4 ft. 6 in. long, covering the entire end surface. The slots were filled in April, 1931, when the concrete had reached practically its future average annual temperature. The thermometer records indicate that the temperature of the blocks raised slightly after this time owing to the heat in the 2 ft. of new concrete and the effect of the warmer outside air.

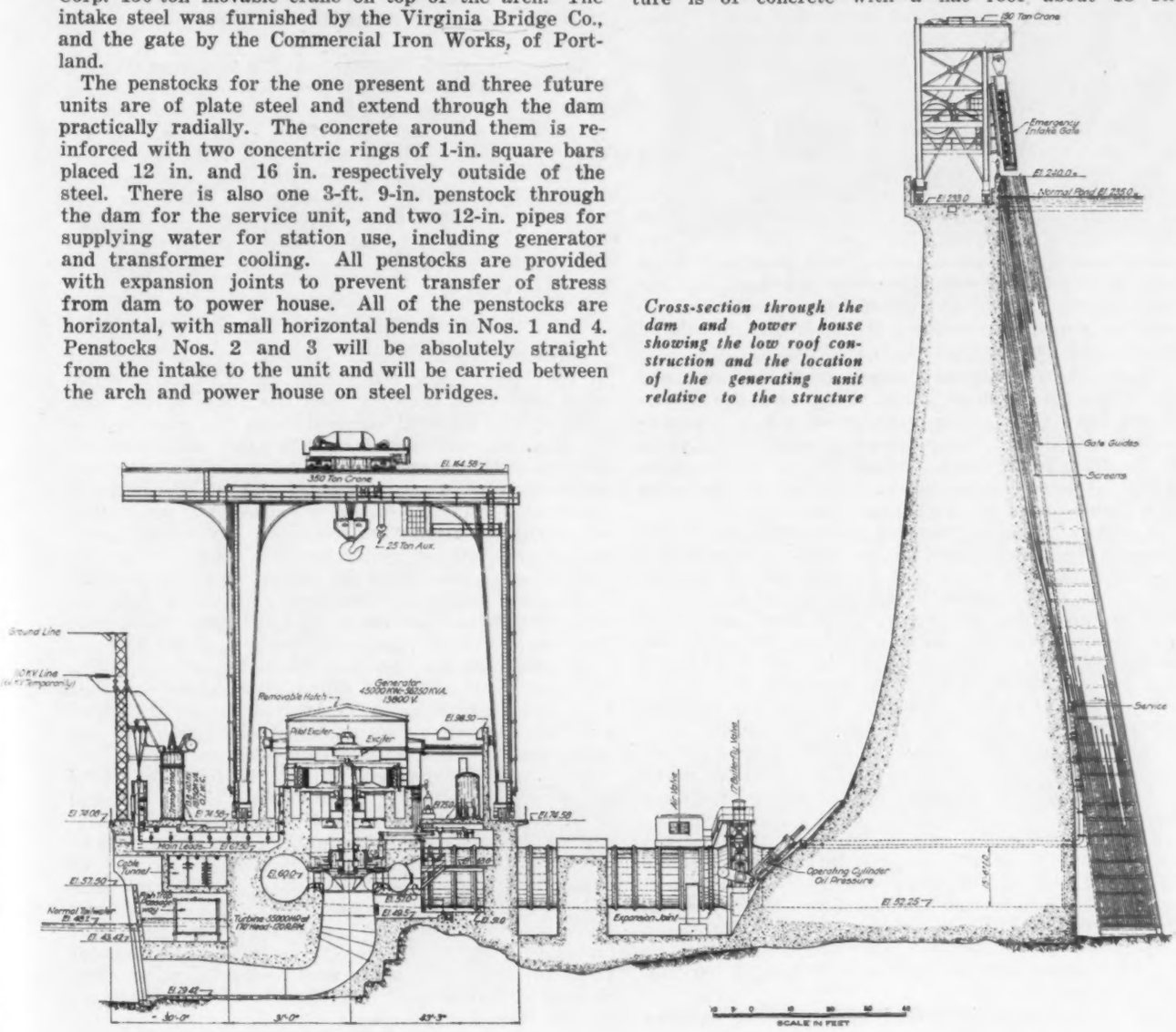
Twenty-one points have been established at three elevations along the arch for recording deflections. Measurements were made previous to filling the reservoir and have been continued to date. It is expected that both the deflection measurements and the concrete temperature readings will be continued through 1932.

Intakes, placed on the upstream face of the arch, are structural steel frames carrying sections of screens. Provision has been made at each intake for the installation of a trash rake; compressed air has also been provided for cleaning the screens. Three of the intakes have been left low and the screens omitted until the future units are installed. One steel, concrete-filled intake gate has been provided for emergency closing of any of the four penstock openings. This gate is handled by a Whiting Corp. 150-ton movable crane on top of the arch. The intake steel was furnished by the Virginia Bridge Co., and the gate by the Commercial Iron Works, of Portland.

The penstocks for the one present and three future units are of plate steel and extend through the dam practically radially. The concrete around them is reinforced with two concentric rings of 1-in. square bars placed 12 in. and 16 in. respectively outside of the steel. There is also one 3-ft. 9-in. penstock through the dam for the service unit, and two 12-in. pipes for supplying water for station use, including generator and transformer cooling. All penstocks are provided with expansion joints to prevent transfer of stress from dam to power house. All of the penstocks are horizontal, with small horizontal bends in Nos. 1 and 4. Penstocks Nos. 2 and 3 will be absolutely straight from the intake to the unit and will be carried between the arch and power house on steel bridges.

A 17-ft. diameter butterfly valve is located in the main penstock at the downstream face of the dam. This valve is operated by means of high-pressure oil and is arranged to open or close in about five minutes. In the case of a large excess velocity in the penstock it will close automatically. A 36-in. diameter hand operated valve is located in the 3-ft. 9-in. diameter penstock just behind the house unit. Both of these valves were furnished by the Pelton Water Wheel Co., of San Francisco. The penstocks were furnished by the Willamette Iron & Steel Works, of Portland.

The power house substructure and superstructure have been built for two units, of which one has been installed. The substructure below normal tailwater and the penstocks through the dam have been built for all four projected units. Each end of the power house is on solid rock, while the central portion is carried over the deeply eroded part of the river on a heavy concrete arch which was built on steel arches used as forms, these being embedded in the concrete. This arch has a span of approximately 70 ft., a thickness of 12 ft. at the crown, and was built in blocks to minimize the stress on the steel arches during construction. These steel arches were furnished by Poole & McGonigle, of Portland. The power house superstructure is of concrete with a flat roof about 18 ft.



Cross-section through the dam and power house showing the low roof construction and the location of the generating unit relative to the structure

above the main floor level. The direct connected main and pilot exciters extend above the roof slightly, being covered by a raised hatch. With this hatchway removed the various generator and turbine parts can be taken through the roof and removed to the repair space in the south end of the building, if desired. The power house is spanned by a 350-ton Whiting gantry crane, having a maximum lift of 80 ft., for handling the main and service units and transformers.

The main generating unit, which is now in operation, consists of an S. Morgan Smith Co. vertical shaft hydraulic turbine and a General Electric Co. overhung-type generator with direct-connected main and pilot exciters. The unit operates at 120 r.p.m. The turbine is rated 55,000 hp. at 170-ft. head and is guaranteed to develop 61,600 hp. at the maximum head of 185 ft. The generator is rated at 45,000 kw. (56,250 kva. at 0.8 power factor) 3-phase, 60 cycles 13,800 volts. The generator is arranged for the future use of damper windings and is the largest unit of the overhung type yet built. The pilot exciter is provided with slip rings furnishing 3-phase power at 155 volts, 8 cycles, to drive the governor flyballs. Generator cooling is by means of a totally enclosed recirculating system using General Electric type vertical coolers, the water being supplied from the reservoir. This unit was tested during September and October, 1931, and was found to meet the guarantees as to efficiency and capacity. The water was measured by the Gibson method.

The small house unit which will supply power for running the station auxiliaries when the main unit is down and the line disconnected, consists of a James Leffel & Co. vertical shaft turbine rated 1,050 hp. at 150-ft. head, and a General Electric Co. generator rated 1,000 kw. (1,250 kva. at 0.8 power factor), 2,400 volts, 3-phase, 60 cycles, 720 r.p.m., with direct connected main and pilot exciters. The main and house units are furnished with Kingsbury bearings. A General Electric Co. 300-kw. motor-driven exciter is provided as a spare for exciting the main unit in case of trouble with the direct-connected exciter.

Main transformers are rated at 18,750 kva. and are of the outdoor type, single phase, 60 cycles, water-cooled, 13.2/115-kv., delta Y-connected, and operate temporarily at 66 kv. The generator is connected directly to the transformer bank through 2½-in. double extra heavy insulated copper tubing installed on insulators in a tunnel under the transformer platform.

A 110-kv. tie line, operated temporarily at 66 kv., connects the transformers to the switchyard, which is located about 800 ft. distant on a bench at the left end of the dam. All switching and synchronizing are done in this yard. The present equipment consists of two Westinghouse, outdoor type, 115-kv., 600-amp., motor-operated oil circuit breakers with an interrupting capacity of 1,000,000 kva. These breakers are equipped with condenser bushing potential devices for synchronizing and for voltage and frequency indication.

The house generator connects into the 2,400-volt auxiliary ring bus, which is a part of the Reyrolle metal-clad switch gear, a reliable, compact group of sixteen switches.

Auxiliary power for various purposes in the power house and on the dam is secured through two General Electric 1,250-kva., 3-phase, 60-cycle, outdoor, self-cooled, 13,800/2,400-volt transformers; three General Electric 200-kva., 1-phase, 60-cycle, outdoor, self-cooled, 2,400/480-volt transformers; and three General Electric 50-kva., 1-phase, 60-cycle, outdoor, self-cooled, 2,400/249-volt transformers.

The control room is located in a separate building downstream from the transformer platform. The amount of space required for controlling a total of four units and the probable large number of future lines connecting to the switchyard made this location the most economical one. The switchboard is a General Electric Co. benchboard type, with vertical instrument and relay panels. A cable tunnel from the station building terminates in the basement under the control room.

Under the conduit tunnel and above the draft tube openings provision has been made for a fish trap to catch the large number of Columbia River salmon which go up the river at various seasons of the year to spawn. Running water is provided in this trap by means of a Worthington motor-driven pump taking its supply from the tailrace. The fish finally jump into a large steel tank which, when full, is hoisted to a truck on the main floor level. The fish are then taken to the hatchery about two miles down the river where the eggs are prepared for hatching. During the operation of the diversion tunnel, a Columbia River fish wheel was placed at its lower end to catch the salmon. This was not entirely satisfactory, many salmon being observed to go through the dark tunnel into the river above. The reservoir is now well stocked with trout and salmon as a result of this. The fish hatchery was built by the power company and turned over to the state for its use.

The switchyard is located about 275 ft. higher than the power house, on the south side of the river. Access to it is by a path from the power house and also by means of a new road down the river and back up the side hill. The 110-kv. tie between the transformers and yard as well as the main line to Portland is operated temporarily at 66-kv. Construction of a submarine cable across the Columbia River early in this year will enable the Ariel output to be taken directly to Portland with considerably less loss than is now being experienced over the smaller line.

Aggregate Secured From River Bed

Concrete aggregate was secured from a large bar in the river below the tunnel outlet. Over 300,000 cubic yards was removed from the bar and this, with some of the material removed from the river bed at the dam, was sufficient for the 350,000 cubic yards of concrete. All concrete was made of one barrel of cement per cubic yard. The water ratio was slightly under 1. Continuous inspection of concrete placed was maintained and laboratory tests were frequent. The average compressive strength of 28-day concrete, as determined by test cylinders, was 2,800 lbs. per sq. in. The concrete in place had a strength considerably exceeding this, this being determined by means of 4-in. cores taken from the dam at various places near the end of the job.

All materials for the Ariel job were received at the Northern Pacific Railroad siding at Woodland and then were trucked 12 miles to the job. The original country road was partially reconstructed, widened, surfaced and maintained by the construction organization.

The Ariel development was built for the Inland Power & Light Co. by the Phoenix Utility Company, of which the late H. F. Lincoln was construction manager in local charge of the work. The power will be used by the Northwestern Electric Co., of Portland, of which L. T. Merwin is vice-president and general manager and O. L. LeFever operating superintendent, and by associated companies. The state of Washington was represented by D. C. Henny, consulting engineer of Portland, Ore. The plant was designed by the engineering department of the Electric Bond and Share Co., of New York.

Carrier Current Equipment Installed in Transmission Line Patrol Stations

By D. R. McCLUNG,
Engineer, Pacific Power and Light Company

WHEN the Pacific Power & Light Co. completed a 75-mi., 110-kv., H-frame transmission line between the Condit plant on the White Salmon River and Union Gap substation near Yakima, Wash., a connecting link was formed between the system of the Pacific Power & Light Co. and the Northwestern Electric Co.'s system terminating at the Condit plant. As the new line will eventually become a part of an important 110-kv. trunk connecting northwest utilities, communication facilities for load dispatching and patrolling will be of great importance.

Traversing a mountainous country comprising that portion of the Cascade Range south and east of Mt. Adams, the right-of-way is quite rough and heavily timbered for most of the distance. A maximum elevation of 3,600 ft. is attained and the higher altitudes are subject to heavy snowfalls and are difficult of access during the winter season.

It would, of course, be impractical to support a metallic telephone circuit on the transmission structures. Early studies showed that a separate telephone lead would be quite costly, and reliability would be an uncertain factor on account of the danger from falling timber along the edge of the right-of-way. Therefore, it was decided to utilize carrier current for communication between terminals and for patrolmen's use. General Electric KCA-1 sets were installed at terminal stations and KCA-400 sets at the wayside stations.

The KCA-1 set has a rated output of 50 watts and is of the single frequency duplex type. It is a standard set and has been in extensive use for a number of years. Condenser type coupling is used with each of these sets, each coupling consisting of a cable type condenser having a capacity of 0.001 mrd. As the transmission line is being operated temporarily at 66 kv., capacitors, tuning units and fuses are mounted on temporary 66-kv. structures in the station yards. KCA-1 sets with motor generator sets and storage batteries are permanently installed in station buildings and are connected to the couplings by overhead lines. This particular type of set was purchased because of the probability of extending the carrier system on other circuits which would require the use of the most powerful and flexible equipment.

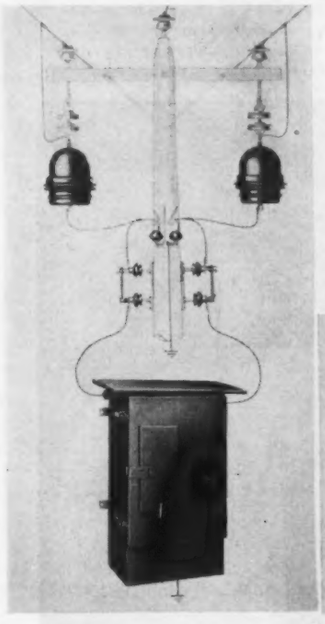
Line grounding switches at terminals are provided with reactors in the phases used for carrier so as to block off the carrier current when the line is open and grounded. This not only permits communication between terminals, but also between terminals and wayside stations in the event that repair crews working on the line desire to call in with the line grounded.

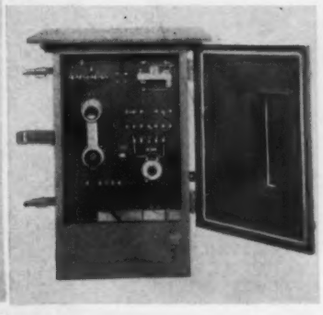
Patrol station housing the carrier current set by means of which the patrolman can communicate with the terminal stations

Wayside stations are the first of this type to be installed in the West. These stations are located at strategic points along the line where they are accessible from roads and trails, yet being adjacent to portions of the line where trouble would most likely occur. Coupling to the transmission circuit is made with three 46-kva. porcelain capacitors assembled in series. Individual capacitors have a capacity of 0.001 mfd. Each set is protected by fuses and gaps mounted on the structure supporting the capacitors. Carrier sets are installed in 8x10-ft. sheet-metal buildings.

The KCA-400 sets are of the single frequency simplex type, requiring manual changeover by means of a push button on the handset when transmitting or receiving. No provision is made for calling any wayside station from terminals as the expense of securing such a convenience could not be justified where the wayside sets are used infrequently. Any wayside station can, however, selectively ring either terminal station. Dry batteries provide the entire source of power for the operation of the sets.

Because of the inaccessible nature of the country, each building housing the carrier equipment is provided with a double bunk, table, and stove, and is provisioned before the beginning of the winter season. The buildings are surrounded by steel fences, and a supply of crossarms, insulators, wire and hardware sufficient for emergency repairs, is stored within each enclosure.





Connections and interior view of the KCA-400 carrier current wayside station used in this installation

Everyone's Self-Interest

Wherein Contractor, Merchandiser, Power Company, Wholesaler and Manufacturer May Profit From the Promotion of the "Ideal Electric Home"

Arranged from a presentation made

By HARRY L. HARPER

Chairman, Appliance Merchandising Committee, Pacific Coast Electrical Bureau*

TRULY an electrical age, which includes the complete electrification of the ideal electric home, apartments, hotels, hospitals, office buildings, industrial plants, warehouses, city streets, highways, farms and oil fields,— such is the goal of the cooperative business development plan as set forth for the Pacific Coast Electrical Bureau at a recent meeting of its board of directors. The plan, beginning with the home as the logical starting place in this period of quiescent industrial plants, encompasses the self-interest of everyone in the electrical industry, whether contractor, merchandiser, power company, wholesaler or manufacturer. In the new competition of industry against industry under this broadly inclusive program, the electrical industry can go forward as a unit for the accomplishment of a very desirable service to the public— and a profitable business for itself.

By taking the home as the logical starting place for such a program, the potential business development for all branches of the industry justifies the concentration of attention of everyone in the industry on this one field now. From it the other divisions of load and business building can be inaugurated step by step.

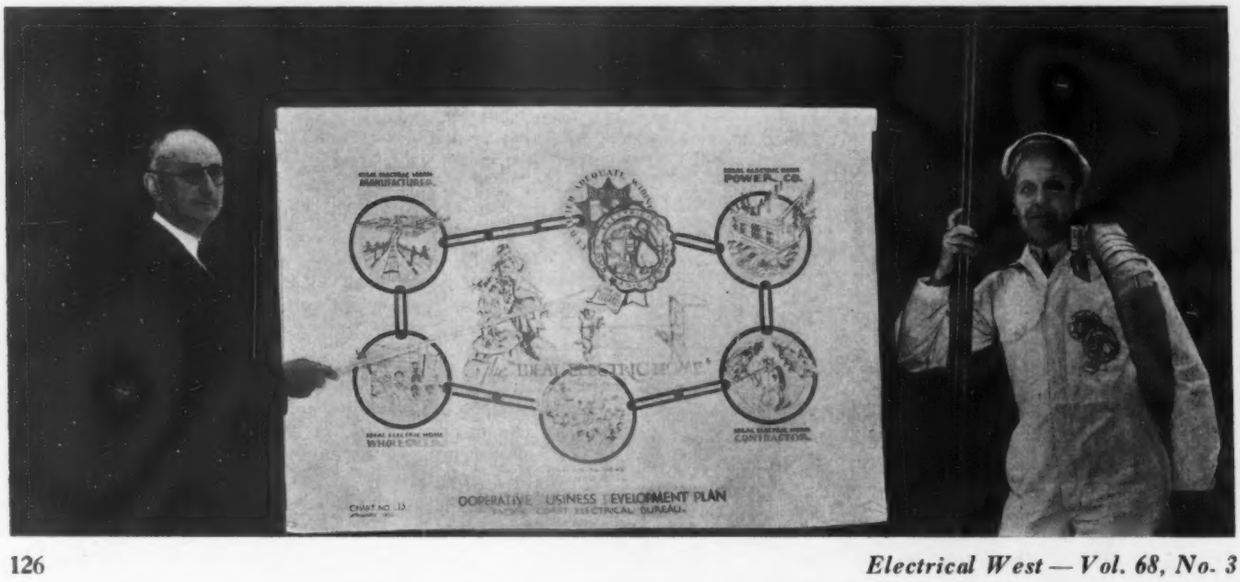
Building of new homes has declined. No one can deny this fact. But that is no excuse for not seeing to it that a greater proportion of the building dollar of every home that is built comes to the electrical industry. The accompanying diagram shows how the building dollar is now divided, according to Department of Labor figures. Only 2 per cent of that dollar is now spent for wiring. Red Seal wiring for such a home will greatly increase this proportion for the industry. Electric heating can eliminate the 10 c. per dollar which now goes into a chimney, and make it available to the owner for electrical appliances, such as range, water heater, ironer, refrigerator, washer. The 9.9 per cent of every building dollar now going into competitive heating equipment can well cover the cost of electric heaters and installation as well as additional wiring for convenience.

Family income percentages further bear out the contention that the electrical industry profitably can earn a greater share of the household budget dollar. At the present time, according to Department of Labor figures, 1.7 per cent of the budget goes for electric energy. In the Red Seal home a much larger proportion goes for this item, and there is every reason that the 5.3 per cent now going to other fuels should come to the electrical industry for heating.

Breaking these markets down still further into their component parts, the homes of California are taken as an example. In that state the 4-room homes total 11 per cent, the 5- and 6-room homes 50 per cent, the 7- and 8-room homes 25 per cent and the 9- or more-room homes 14 per cent of the new building totals. This averages 6.6 rooms for the average home.

In the same state estimates made by the P.C.E.B. indicate that there are 1,481,013 homes wired, or 98½ per cent of the total. Of these there have been issued certificates to 9,556, or but 2/3 of 1 per cent. The number

*Presented as a "Cooperative Business Development Plan" to be sponsored by the Pacific Coast Electrical Bureau in its 1932 program.



Mr. Harper (left) with the final chart of the presentation, showing the interrelation of the various branches of the industry to the "Ideal Electric Home" plan. K. E. Van Kuren, (right) as the wideawake wireman wearing the Red Seal and Blue Seal emblems, helps sell the idea to the public

of homes at present wired for electric ranges is placed at 91,822, or only 6.2 per cent of the total. It is also significant that the average number of outlets in the average non-Red Seal seven-room home is only 30, whereas in the Red Seal home of the same size the average is 83 outlets, or almost three times as many.

As to current consumption, the possibilities are likewise slightly better than untouched. The average for the United States is given by N.E.L.A. as 550 kw.-hr. For the purposes of this presentation an average was struck between the average for the two largest companies in California, and the figure of 714 kw.-hr. results, which many will agree is quite conservative.

Estimates of consumption among straight lighting rate consumers, using the same method of deriving the average, shows a poor 491 average kilowatt-hour consumption. By averaging the bills of Red Seal home customers throughout the state with those using lighting and a range, an extremely conservative figure of 3,500 kw.-hr. per year is obtained. An ideal electric home, as will be shown in a separate table, would consume 11,700 kw.-hr. per year, an almost unbelievable figure compared with present averages.

Further estimates of market saturation reveal the immense possibilities. It is estimated that California homes are equipped with dishwashers to the extent of but 0.5 per cent, water heaters 2.1 per cent, ironers 3.3 per cent, ranges 6.2 per cent, refrigerators 16 per cent, sewing machines 16.1 per cent, washers 35.1 per cent, vacuum cleaners 44.4 per cent, and most surprising of all, radios only 51.9 per cent.

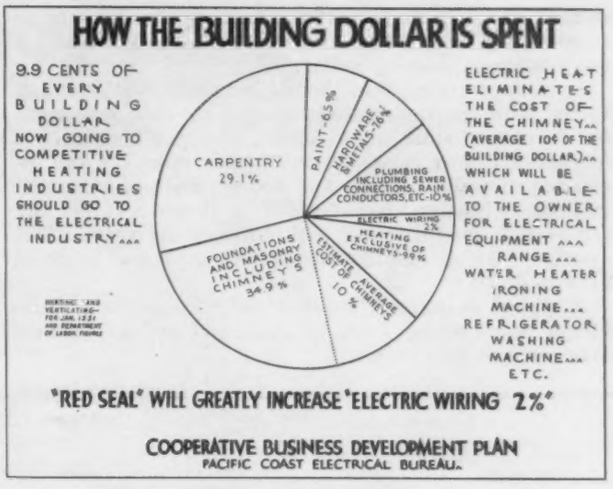
Contrast this with the possibilities of an ideal electric home, fully equipped with the appliances which can be used in such a home. The following table speaks eloquently for itself:

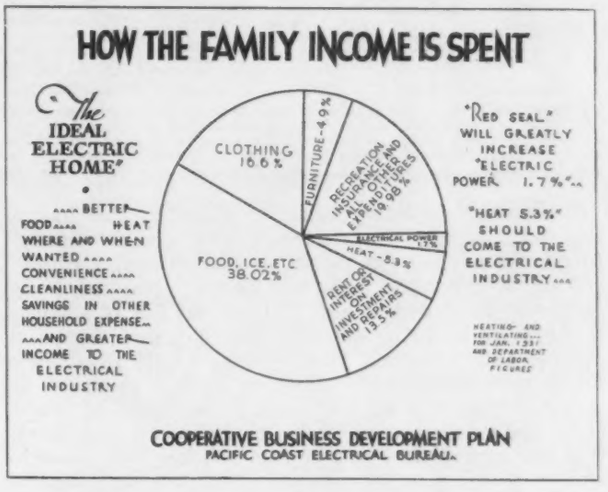
Appliances*	Watts Capacity**	Annual Consumption** (kw.-hr.)
Lighting fixtures and lamps	3,100	500
Sunlamp	175	25
Radio	110	90
Vacuum cleaner	125	36
Washing machine	125	40
Refrigerator	200	600
Range	8,000	2,000
Ironing machine	1,300	125
Water heater	4,000	3,000
Sewing machine	125	35
Dishwasher	125	40
Fan	125	24
Kitchen exhaust fan	200	40
Electric iron	660	50
Percolator	450	50
Toaster	600	50
Waffle iron	660	
Heating pad	40	
Curling iron	20	
Food mixer	50	
Juice extractor	100	
Egg beater	25	
Drink mixer	50	
Waterless cooker	400	44
Egg cooker	200	
Bottle warmer	100	
Corn popper	250	
Kitchen aid	200	
Floor polisher	150	
Electric clock	2	
Total	21,667 watts	6,749 kw.-hr.

*Electric air space heaters not included.
**N.E.L.A. public relations committee booklet, "Electric Service in the American Home," 1930-31.

For this entire equipment the average total retail price would be $1,500, which indicates the potential market for the wide-awake electrical home appliance dealers in complete home electrification.

To carry this a bit further and add to it electric heating for such a home would result in the following connected load and annual consumption. A Red Seal home, complete with the appliances listed above, would consume, in round figures, 6,700 kw.-hr. Add electric heating for a seven-room home under California conditions,


HOW THE BUILDING DOLLAR IS SPENT
9.9 CENTS OF EVERY BUILDING DOLLAR NOW GOING TO COMPETITIVE HEATING INDUSTRIES SHOULD GO TO THE ELECTRICAL INDUSTRY
CARPENTRY 29.1%
PAINT-6.5%
HARDWARE & METALS-16%
PLUMBING INCLUDING SEWER CONNECTIONS, RAIN CONDUCTORS, ETC-10%
ELECTRIC WIRING 2%
HEATING EXCLUSIVE OF CHIMNEYS-9.9%
AVERAGE COST OF CHIMNEYS 10%
FOUNDATIONS AND MASONRY INCLUDING CHIMNEYS 34.9%
ELECTRIC HEAT ELIMINATES THE COST OF THE CHIMNEY (AVERAGE 10% OF THE BUILDING DOLLAR) WHICH WILL BE AVAILABLE TO THE OWNER FOR ELECTRICAL EQUIPMENT
RANGE
WATER HEATER
IRONING MACHINE
REFRIGERATOR
WASHING MACHINE
ETC.
"RED SEAL" WILL GREATLY INCREASE "ELECTRIC WIRING 2%"
COOPERATIVE BUSINESS DEVELOPMENT PLAN
PACIFIC COAST ELECTRICAL BUREAU.


HOW THE FAMILY INCOME IS SPENT
The IDEAL ELECTRIC HOME
BETTER FOOD HEAT WHERE AND WHEN WANTED CONVENIENCE CLEANLINESS SAVINGS IN OTHER HOUSEHOLD EXPENSE AND GREATER INCOME TO THE ELECTRICAL INDUSTRY
CLOTHING 10.6%
FURNITURE-4.9%
RECREATION INSURANCE AND ALL OTHER EXPENDITURES 19.98%
ELECTRICAL POWER 1.7%
HEAT-5.3%
FOOD, ICE, ETC 38.02%
RENT OR INTEREST ON INVESTMENT AND REPAIRS 13.5%
"RED SEAL" WILL GREATLY INCREASE "ELECTRIC POWER 1.7%"
"HEAT 5.3%" SHOULD COME TO THE ELECTRICAL INDUSTRY
COOPERATIVE BUSINESS DEVELOPMENT PLAN
PACIFIC COAST ELECTRICAL BUREAU.

and 5,000 kw.-hr. more annual consumption would be added, or a total of 11,700 kw.-hr. This estimate of heating consumption is based on an average of northern and southern California climatic conditions, and of course would vary, but at least enlarges the opportunity of the electrical industry greatly.

To serve this load of 11,700 kw.-hr. we estimate that it will take approximately 36 kw. of demand capacity. This is derived by assuming the average of 24 kw. capacity in heat for a seven-room home, adding the range capacity of 8 kw. plus the 4 kw. for the water heater, making a total of 36 kw. and assuming that the appliances would come in on the diversity factor of this connected load. Possibly this is high, but it is better to be on the safe side.

No one can gainsay that there is a big market waiting to be served and that it can be sold on the advantages of electrical appliances and services. An appropriate slogan might well be, "Live in an Ideal Electric Home, enjoy the family and life."

To illustrate the advantages—and the selling points, incidentally—of the electrical appliances which go to make up that home, a chart of them has been prepared. In it are set forth first the electric kitchen appliances, next those of the service porch or laundry, and then the housekeeping electrical needs. The particular advantages of electric heating are set forth themselves emphatically.

The next logical step after consideration of electric heating is the realization of the necessity for well in-

sulated homes in order that the heating may be done as economically as possible. Heat losses materially affect the California heating dollar.

It is appreciated that bodily warmth and comfort varies with the temperature of the air that surrounds it. Insulation sufficient to insure economic heating will increase building costs $25 to $30 per room for the insulation of walls, ceilings and floors. Such construction will reduce heating losses from 30 to 50 per cent and pay for itself in fuel economy within five or six years. The average cost to insulate a seven-room house is from $175 to $210.

A typical example, a study of heat losses for a California home whose areas of heat loss are as follows, demonstrates this fact:

UNINSULATED			HEAT LOSS AREAS (Sq. ft.)		INSULATED		
Watts loss per deg. difference between outside and inside temperatures per sq. ft.	total	Percent total loss			Watts loss per deg. difference between inside and outside temperatures per sq. ft.	total	Percent total loss
0.10	354	19.0	Walls	3,540	0.05	177	14.1
0.15	496	26.7	Ceilings	3,305	0.05	165	13.2
0.10	331	17.8	Floors	3,305	0.07	231	18.4
0.30	342	18.3	Doors, windows	1,140	0.30	342	27.3
	338	18.2	Air volume (cu. ft.) (2 changes per hr.)	31,760		338	27.0
Total heat loss	1,861 watts	100.0 %			Total heat loss	1,253 watts	100.0 %

NOTE: There is 32.6 per cent less heat loss (1,253 compared with 1,861) in an insulated home. When insulation is applied to an uninsulated home which required 5,000 kw.-hr. of heat, this 32.6 per cent saving represents 1,630 kw.-hr. or $32.60 per annum.

Too strong emphasis cannot be given to the importance of insulation in connection with electric heating. In fact no heating job should be sold without a consideration of this very important factor. Not only does insulation keep electric heat in the home but in summer it serves to keep the sunlight heat out, and always it reduces outside noises, thus offering triple advantages for an investment which in heating savings alone will be repaid within five or six years. Insulation of walls, floors and ceilings, weather stripped windows and doors, thus provides cooler homes in summer, less heat losses in winter, less inside or outside noise, less fire hazard, longer life to the building, greater comfort and economy in all ways.

Space does not permit the comparison here of costs of electric heating for office buildings. The method of comparison, however, has been given in a previous article (ELECTRICAL WEST, June 1, 1930, p. 632) by H. H. Douglas, of the Southern California Edison Co. Ltd., and demonstrates very clearly that where every factor is taken into consideration not only are the installation costs of heating buildings by electricity less than for the installation of complete steam or other heating systems, but in operation costs, too, the savings are material. The factors that must be taken into account, however, are not only fuel cost but interest on investment, depreciation, obsolescence, taxes, fire insurance, administration charges, boiler insurance (both indemnity and property damage), operating labor, materials, supplies, maintenance, repairs, other uses of electricity benefiting by the lower rate, permits, licenses, inspection fees, compensation insurance, floor space, cleaning and decorating.

If it seems that great emphasis is being placed on electric heating, let it be said that this is one of the best electric result producers. Let us follow it back of the outlet from which it is supplied.

Every Red Seal home creates an average of at least $3.50 per outlet for supplies and labor. A seven-room Red Seal home with an average of 83 outlets creates $290 of business for the electrical contractor, wholesaler and manufacturer.

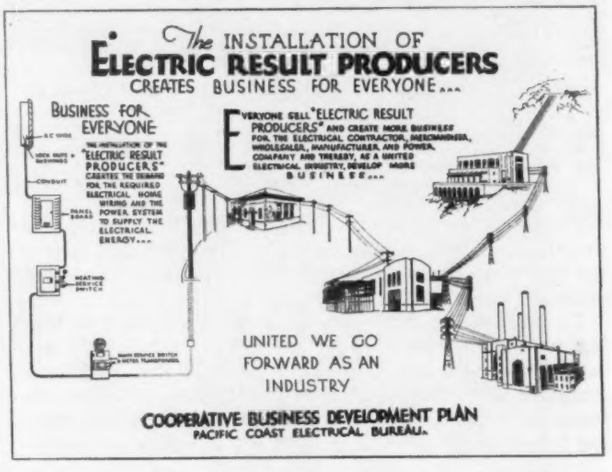
Electric heating added to Red Seal creates an average of $69 per heater outlet for electric heaters, supplies and labor. The addition of 24 kw. of electric heat to a seven-room Red Seal home requiring ten heating outlets, creates an average of $690 of additional business for the contractor, wholesaler and manufacturer.

The "Ideal Electric Home," then, would represent the $290 of the Red Seal home, plus the $690 of the electric heating, making a total of $980 for contractor, wholesaler, and manufacturer. Compare this to the pitiably low average of about $75 for wiring the ordinary house. Can anyone deny the interest of all those involved in the promotion of such a plan? Yet that is but part of the story.

To determine the effect of this 36 kw. of connected demand on the power company service facilities, and by that means on the suppliers of pole line, substation, generating and transmission equipment, the engineering department of the Edison company was asked to estimate these data. Total peak load to the connected horsepower gives a factor of approximately 3:1. On this basis the value for total transmission, substation and distribution, divided by the peak demand, gives the investment per kw. of demand. This divided by the ration of 3:1 gives a figure of $152.

Experience has shown that the connected load in homes and in some of the completely electrified apartments, can be divided by three in determining the transformer capacity and line facilities necessary to supply service. The reason for this is the great diversity of the use of home electrical equipment. Thus we estimate that $51 is the portion of the system which must be invested in distribution, substations, transmission and generation per kilowatt of installed capacity in the completely electrified home.

This breaks down about as follows: Distribution system $31 per kw., substations $5, transmission system $5, generation $10; total $51. Thus for 36 kw. of demand the total power company investment for the ideal electric home would be $1,836. This figure is of particular in-


The INSTALLATION OF
ELECTRIC RESULT PRODUCERS
CREATES BUSINESS FOR EVERYONE...
BUSINESS FOR EVERYONE
UNITED WE GO FORWARD AS AN INDUSTRY
COOPERATIVE BUSINESS DEVELOPMENT PLAN
PACIFIC COAST ELECTRICAL BUREAU.

terest to the manufacturers and distributors of central station equipment, and demonstrates that their self-interest is also involved materially in this program.

The business for everyone which a quota of 3,000 ideal electric homes would develop is summarized in the following table:

For the contractor, merchandiser, wholesaler and manufacturer	
1. Red Seal wiring of 3,000 homes (7 rooms, 83 outlets) at $290 each	$ 870,000
2. Electric heat only, including wiring and heaters (7-room homes, 10 heaters, at $690 each)	2,070,000
3. Total for ideal electric home, less appliances (items 1 and 2, at $980 each)	$ 2,940,000
4. Appliances for the ideal electric homes (3,000 homes, each with $1,500 in appliances)	4,500,000
5. Power company investment to serve 3,000 homes, each requiring $1,836 investment to serve, or 108,000-kw. load	5,508,000
	$12,948,000

For the power companies

At Present	Annual Revenue	Revenue 3,000 Such Homes	Per cent Increase Item 1
1. Straight lighting rate, average revenue from 3,000 present consumers, per home, at 490 kw.-hr. per annum	$24 ($2 per mo.)	$ 72,000	
2. Red Seal, average revenue from 3,000 present customers, at 3,500 kw.-hr. per annum per home	$94 ($7.85 mo.)	282,000	292
Possibilities			
3. Red Seal homes, fully appliance equipped, at 6,700 kw.-hr. per annum	$158 ($13.16 mo.)	474,000	558
4. Electric heating only, 5,000 kw.-hr. per annum additional	$100 ($8.33 mo.)	300,000	317
5. Ideal electric home, fully equipped with appliances and electric heating, at 11,700 kw.-hr. per annum	$258 ($21.50 mo.)	774,000	975

The rate base in making these estimates is as follows: First 25 kw.-hr. 5 cents, next 125 kw.-hr. 3 cents, all over 150 kw.-hr. 2 cents.

Fully realized in this manner the possibilities are big, they are inclusive and they are immediate.

In bringing together these data we have endeavored to do so on an average for California, and while doing so have had conspicuously in mind the importance of the figures illustrating the basic principle that the business of the industry starts from the point of the installation or sale of *electric result producers*. Everyone in the industry, whether selling locknuts, bushings, transformers, copper wire, insulators, poles, labor, in fact anything which is back of the electric result producers, has a definite self-interest in promoting the sale of these result producers.

An "electric result producer" is anything which delivers the ultimate result from electricity to the public. Thus, while this story has been worked up around the all-electric home and electric heat, the fundamental principle is the same—the business of all those in the industry is dependent upon the installation of these electric result producers, whether they be heaters, ranges, water heaters, lighting fixtures, motors, welding machines, furnaces, or any other form of electrical appliance or application. As a matter of fact, this broad principle overshadows any particular application which may be promoted under the fundamental involved.

The final word is simple. It is that everyone in the industry self-interested in such an activity, must put his shoulder to the task, not only financially but through every-day sales activity not only in the sale of his individual commodities, but through the promotion of the greater use of *electric result producers*. How this works is best illustrated by the attitude of one manufacturer's representative when told of this program.

"Never before did I see that our business is dependent upon the sale of electric result producers. We have six men who are calling regularly on architects and large builders. Just as soon as we can give them the story we will instruct them to make it a definite part of their work to sell electric result producers."

▼

SCOTT Bros. Electric Co., in Denver, believes it is a distinct advantage not to have their store too attractive, because the "man in overalls" will be afraid to enter. A neat shop with interesting displays is better than a too elaborate store.

What's in a Name?

$100

ONE hundred dollars for a word! That's enough to make the winner one of the highest paid authors in the world, and it is paid for just a little extra whirring of the brain gears. If a contest is a challenge to your ability, you're challenged.

This amount is the prize offered by the Pacific Coast Electrical Bureau and ELECTRICAL WEST to anyone who submits the best single word for describing and selling electrical heating. The two words "electrical heating" are too long; they lack descriptive and selling powers to the layman and builder. The sponsors want a name, preferably of one syllable and not more than two, which can be used in place of the two words and which will symbolize the advantages of electric heating. Maybe you can think of just the right name.

For instance, these names have been suggested by disinterested persons:

Electric Healtheat
Electric Sunheat
Electricfresh Heat

However, analysis will show that none of these names meets the requirements. But they may give you an idea. Another suggestion: An ice cream manufacturer calls his product "Sunfreze" because he claims all the healthful qualities of the sun have been frozen into his ice cream. Now coin some name which will show the benefits of electric heating—benefits such as cleanliness, healthfulness, safety, economy, flexibility and efficiency.

RULES

1. *Names submitted must contain not more than two syllables.*
2. *Suggested names must be printed in ink or typewritten on one side of the paper. Name, address and occupation of contestant must be written on reverse side of the page.*
3. *Entries must be postmarked prior to midnight May 31, 1932, to be eligible. Suggestions will not be considered as valid entries unless received by the sponsors.*
4. *All entries must be addressed to CONTEST EDITOR, ELECTRICAL WEST, 883 Mission St., San Francisco, Calif., U.S.A.*
5. *Anyone is eligible to submit suggested names except the judges and families of the judges.*
6. *Judges will be the Executive Committee, Pacific Coast Electrical Bureau.*
7. *Decision of the judges will be final.*
8. *Duplicate awards will be made if the winning name is duplicated.*

It might be well to read the preceding article in this issue on "Everyone's Self-Interest" which describes the advantages of electric heating which can be sold and the industry's plan for selling them. With all the facts firmly in mind, it will be much easier to vizualize a good one-hundred-dollar word.

When you have found a suitable name (or names, because you may enter as many suggestions as you wish), write the word or words on one side of a piece of writing paper. Print the words in ink or typewrite them; penciled writing is not acceptable. Then, on the other side of the page write your name, address and occupation. Mail all suggestions to CONTEST EDITOR, ELECTRICAL WEST, 883 Mission St., San Francisco, Calif. All entries must be postmarked before 12 midnight, May 31, 1932, to be eligible for a prize. The winning name will be announced at the Pacific Coast Electrical Assn. Convention in June and the winner notified immediately afterward. But don't wait until the last day. Mail suggestions now to be sure they are received. Send in suggestions every day, if you like.

If any question arises, write to the CONTEST EDITOR; he will answer any inquiries. Read the rules carefully to avoid mistakes.

Enlist your friends. Collaborate with them in coining a prize-winning name. But be sure to send in your suggestions, because you may be the one who wins one hundred dollars and the gratitude of the entire electrical industry.

▼

Now on Sale— "Fire-Approved" Irons

DEALERS who are looking for new selling points on irons can now advertise "fire-approved." Because the Underwriters' Laboratories have joined a crusade against fires caused by electric irons by supplying three of the eleven manufacturers of automatic irons with yellow tags, about the size of a silver dollar, which remain on the handle of the iron until removed by the purchasers. One side of the tag reads:

> Electric flat irons automatically controlled to prevent overheating and built to our safety standards are a valuable protection against fire in your house.
> UNDERWRITERS' LABORATORIES, Chicago.

On the opposite side is the further assurance:

> Samples of this (trade name) iron, Cat. No. ——, have been tested by us and found to conform to our safety standards.
> Issue No. A-I

It is hoped that these statements will bring the purchaser to the realization that an automatic iron should be his choice and will give the dealers an extra talking point for automatic irons. Because of the extra margin allowed by the higher price, these irons offer more profit and greater salability to the dealer.

Takes His Business With Him

ILLUSTRATING one of the methods adopted by F. C. Quinn, enterprising district representative of the El Paso (Texas) Electric Co., to help him sell Kelvinators. The spare tire was removed from his automobile, and a frame bolted onto the rack in its place as shown, to be used for displaying small posters. The frame has been constructed so that new posters may be inserted as desired. A battery of small hooded lights placed at the top of this frame provides ample illumination at night. Mr. Quinn plans to go further; by means of a wiring installation connected to the windshield wiper he proposes to create a flasher effect. Illuminated arrows and other suitable markers will be designed as attention getters and arranged to flash on and off, thus directing attention to salient points in various sales messages to be carried on the various posters displayed.

▼

From Flowers To Fixtures

FLOWERS run in the Curry family. At least both L. J. Curry, contractor-dealer of Dinuba, Calif., and his brother, T. H. Curry, proprietor of the Fresno Electric Co., of Fresno, run florist shops as adjuncts to their electric stores. An attractive store, colorful, bright, is the first advantage gained from this arrangement. Although seemingly a far cry from the electrical business, the floral department often results in lighting decoration business, and it attracts many women to the fixture department. In commenting upon the general health of the fixture business, T. H. Curry brings out the point that the right approach to refixturing and fixture sales is national magazine advertising. The dealer doing much local fixture advertising is wasting his money, he believes. "It isn't the plumber that sells the bathroom," says Mr. Curry, "it is the national advertising. What is a bathroom? Only a place to bathe, not a main living room. And yet few people spend less than $1,000 on a bathroom. Fixture advertising in national women's magazines run some years ago brought results for as long as three years later. But such advertising should be in the women's and not the men's magazines. Fixtures are chosen by the women."

▼

You Catch It, We Keep It

FROM the Southern Oregon Electric Co., Medford, Ore., comes an idea for dealers in refrigeration. They have installed this refrigerated display case in the entrance of a hardware store to display fish and other game caught in the surrounding territory. The display is good advertising for the sporting goods department and offers a new outlet for a refrigerating unit. Still another prospect is the store whose windows absorb light and heat, thus ruining certain displayed goods. A cooling unit is installed to keep the air cold and prevent spoilage.

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ABOUT THE SIZE of an ice cube, a molded glass cube is carried around in his pocket by N. H. Graves, lighting salesman for the Pacific Gas and Electric Co., of San Francisco. It serves two important sales purposes in an unexpected way. The first use is that made by tossing it carelessly from one hand to the other when interviewing a store proprietor who refuses to discuss his lighting. It awakens his curiosity and he usually asks what it is. This gives Mr. Graves his second use for the glass cube. With it he shows the glare coming from the overhead or improper lighting. With these two openings he can usually continue with his reasons for good lighting and the particular lighting which would be effective for the prospect.

California's Own "Noble Experiment"

By K. I. Dazey,
Managing Director, Pacific Coast Electrical Bureau

PARAPHRASING Shakespeare: "To merchandise or not to merchandise; that is the question." A question, it is true, which has occasioned no small degree of controversy in which the power companies and the retail dealers frequently are not in entire accord as to the ethics and fairness of a continuation of utility merchandising.

As is true with all controversial issues, there are two sides to the question, and it is only fair that each viewpoint receive impartial and respectful consideration, with the view to the development of a common interest.

The Retail Dealer

Let us first consider the retail merchandiser of electrical appliances. His primary aim and purpose is to turn over his stock in trade at sufficient intervals and at a proper mark-up in prices to enable him to enjoy an adequate profit from his business commensurate with both investment and volume; therefore, merchandising is the essence of his business. There is no law which compels him to handle any type or character of merchandise in which competition or margin of profit results in a loss to him, nor would it be good business practice for him to do so.

With the unprecedented growth of the electrical industry, however, the retail dealer has envisioned an opportunity for expansion of his business, and properly so. With a national curtailment in the outlay of Mr. Average Citizen (which has affected volume of every line of merchandising) the retail merchant devotes himself to a closer study of his business, including operating expenses, sales turn-over, etc. If he is in the clothing business or any other staple line he naturally will blame a reduction in volume on his competitors or on a "buyers' strike." If, however, he is a dealer in electric appliances and volume of sales has fallen off, his reaction frequently takes the form of creating in his own mind the feeling that the utilities are usurping his natural, normal right as a dealer in such appliances by continuing in the merchandising field. There can be no question as to the sincerity of purpose of many of the retail merchants who voice the belief that their appliance business would increase if the utilities discontinued the sale of such appliances directly to consumers. The correctness of this opinion is, of course, the question which we are considering.

The Utility

From the standpoint of the utilities of California, the sale of appliances directly to their consumers is of vital importance, not from the aspect of merchandising profit, but primarily for the purpose of load building. Gross merchandising profits are invariably fed back into advertising and sales effort to create an increasing demand for their prime commodity, whether gas or electricity, and efforts are energetically directed toward the sale of such appliances as are conducive to a load building program.

At this point we reach a divergence of opinion or a parting of the paths of thought. With varying degrees of justification retail dealers advance the argument that they represent the logical merchandising outlets and, as such, are properly equipped to carry on the load building programs of the utilities, providing they are left with a clear field, but experience has proved the utter fallacy of this thought, for reasons which will later be discussed.

Half a truth invariably is misleading, and the fact that the half-truth may in some instances be presented with every degree of sincerity does not alter the fact that it leads to false and erroneous conclusions. It is for the purpose of attempting a clarification of utility merchandising in California that this article is written.

Experiments in Southern California

Acting upon a request from dealers in Long Beach, Calif., the Southern California Edison Company Ltd. discontinued the merchandising of appliances in that city in October, 1930, it being represented by the retail dealers that they were in a position to carry on the load building activities of the Edison company and to do as good or a better job.

Feeling that a compliance with the request of the dealers in Long Beach might prove helpful in a settlement of the controversial question of utility merchandising, all direct sales were discontinued. The Edison company matched dollar for dollar with the dealers in promotional advertising and continued to maintain a display of appliances in its offices. All prospects were referred to dealers and a card listing the dealers handling electrical appliances was turned over to each prospect.

Manufacturers and wholesalers of electrical appliances, visualizing a possible outlet for their wares through this experiment plan, flocked to Long Beach, and an unusual amount of volunteer talent offered itself to aid the local dealers in putting across their program of independent merchandising. Perhaps a comparison of the results may prove enlightening:

Number of ranges sold in Long Beach during the first eleven months of 1930 by Edison company	220	
Number of ranges sold to apartment houses during the same period	141	
Number of ranges sold by dealers during the same period	11	
Total		372

For the same eleven months period of 1931 the sales record stands as follows:

Number of ranges sold to apartment houses	27	
Number of ranges sold by dealers	59	
Total		86
A falling off in volume of or a reduction of more than 76 per cent.		286

At the instigation of local dealers in the San Joaquin Valley territory of the Edison company (comprising the cities of Visalia, Porterville, Tulare, Hanford, Exeter, Delano and Lindsay) the company discontinued its direct merchandising of appliances at the beginning of 1931. Heretofore this valley territory had produced a very substantial volume of range sales. Again the retail dealers assured the Edison company that they were in a position to carry on the load building program.

From this experiment many controversial statements have been made. Inasmuch as there were many retail dealers who were also selling appliances in this territory in 1930, and as many of these appliances did not require special wiring, no records were available of the total volume of appliance sales by retail dealers for the year 1930, and in setting up a 1931 quota for the dealers this was done on the basis of 1930 sales of socket appliances made by the Edison company (which

includes refrigerators, washers, etc.). The volume of range and water heater sales, however, during the year 1930 was definitely established because of the necessity of service runs, range and water heater wiring, etc. Any attempt therefore to compare the volume of socket appliance sales would prove unavailing in the study of relative volume.

That the retail merchants have exceeded the quota established on refrigeration is not, under these conditions, surprising, particularly with the increasing public demand for refrigeration and with the national cooperative campaign which was placed in effect in 1931.

Again take the comparison of range sales as applied to the San Joaquin Valley territory:

Total range sales during 1930	722
Range sales during 1931*	173
Reduction in number of ranges sold. This is a reduction in 1931 as compared with 1930, of 76 per cent.	549

* December estimated proportionately.

It will be noted in the cases of both Long Beach and the San Joaquin Valley territory that the range sales showed a reduction in each instance of 76 per cent.

Granting every possible latitude in the matter of variability of conditions for the two years, and with allowance for every probable pretext upon which this falling off in volume theoretically can be accounted for, these facts conclusively prove that in these two test cases the dealers have not fulfilled their assurances in carrying on the load building programs of the power companies.

Loss to Industry

Long Beach—286 range installations at an average wiring price of $45 totals $12,870. Sales of 286 ranges at a low average price of $125 totals $35,750, or $48,620 lost in sales and installations.

San Joaquin Valley—539 range installations at an average wiring price of $35 totals $18,865. Sales of 539 ranges at a low average price of $125 totals $67,375, or $86,240 lost. Losses in both districts amounted to $134,860.

Estimating 1,800 kw.-hr. as the average annual consumption of a domestic range, the 825 range sales thus lost represent a loss in power company load of 1,485,000 kw.-hr.

In addition to the loss in range sales, the number of electric water heaters sold in the San Joaquin Valley during 1930 was 185, as against 75 for the first eleven months of 1931. Adding a proportionate figure for December sales would give a total of 82 water heaters for 1931, or a net reduction of 103.

Without minimizing the value of any type of energy consuming appliances, it must be conceded that the domestic range load is one of vital importance to practically every branch of the industry, and especially so to the electric utilities. All too large a percentage of users of electricity are served at an actual loss, due to small consumption of energy; such consumers represent a liability, not only to the power companies but also to other consumers, as the loss from this class of business must be taken into rate structures. The addition of the range load transforms a liability to an asset with a concurrent benefit to the purchaser of a range through a reduction in rate.

The sale of electric ranges is not an "over-the-counter" matter; it requires a greater and a more specialized effort than it is possible for the average retail dealer to devote to it, and until there is a more definite public demand for the electric range this condition will remain unchanged. At the present time only 5.3 per cent of wired homes in the United States have electric ranges installed.

With the growth of the industry and with the continuing discoveries of new and practical uses of electricity, by the time a greater public demand for electric ranges has been created, other applications will require the pioneering of new appliances, and the utilities are the only ones who can or will conduct this pioneering.

It is not many years ago that the electric iron (today the most commonly used appliance) was sold only through the salesman of the utilities and was not carried in stock by retail dealers because of lack of public demand. This demand for irons and other appliances was created by the utilities with resultant benefit to the dealers; today even the drug stores are selling the smaller electrical appliances, and it is of more than passing interest to note that in one of our mid-western states a retail drug association has joined in a protest against the sale of such appliances by the utilities!

That utility merchandising in the successful marketing of electric ranges is a prime factor in volume of sales and in load building is indisputable. We have considered two unsatisfactory experiments in southern California, and a further comparison will substantiate this fact.

In Los Angeles, where electric ranges are sold only through dealers, but where a large sales force is maintained for the specific purpose of assisting retail dealers in effecting sales, together with liberal appliance advertising, the proportion of electric range users to electric consumers is only 1.2 per cent. The national saturation figure is 5.3 per cent, and on the lines of the Southern California Edison Comany Ltd., where aggressive merchandising has been carried on, this figure is 7.9 per cent.

A further comparison also proves interesting:

Average annual consumption per domestic consumer, city of Los Angeles	557 kw.-hr.
Average annual consumption per domestic consumer, territory served by Edison Co.	715 kw.-hr.

Conclusions

In so far as California conditions are concerned, it therefore must be conceded that:

1. The result of utility-dealer cooperative effort is greater merchandise volume, greater sale of electricity, better load factor; the practical effect is more profit for the dealer, more electric business for the utility, and a constantly decreasing unit cost of service to the consumer.

2. In the interest of the best possible service to the consumer of electricity, utilities have handled only those types of appliances which give satisfaction and convenience to users, thus establishing standards of merchandise quality. In the absence of such standards, retail dealers would sell appliances which offer a larger margin of profit made possible by the cheaper quality of the product.

3. An improvement in the existing high standards of service is dependent upon utility promotional merchandising. The retail dealer in the majority of instances handles other lines of merchandise, and devotes his efforts largely to the sale of commodities for which a definite customer demand exists. Logically, therefore, the burden of pioneering of electrical appliances must be assumed by the utilities.

4. Aggressive and cooperative sales efforts of utilities and retail dealers is a boon to humanity through the purchase and use of economical labor saving devices.

Ford Electrification —Model A

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Adequate Electrical Service Is Insured by Basing Distribution Layout on a Watts-Per-Square-Foot Basis. Efficient Production Relies Upon Adequate Lighting, Synchronized Material Handling and Special Tool Equipment Made Possible by Modern Electrical Applications

DURING the past year the Ford Motor Company completed strategically located Pacific Coast assembly plants at Seattle, Wash., and Richmond, Calif., which will supplement production activities of the Long Beach plant, operating since 1930. The advent of large scale motor car production is of major importance to this section of the country and these plants should be particularly interesting to the electrical industry because of the manner and extent to which energy is used to secure efficient production.

Representative of these important additions to Western industry is the Richmond plant located on a 50-acre site bordering on San Francisco Bay. This site was selected because of the excellent facilities available there, included among which are a 30-ft. channel from San Francisco Bay, service from three transcontinental railroads, a reliable source of low cost electrical power and a central location in a populous and growing area.

The factory building itself is a two-story structure with a saw-tooth roof construction. Windows approximate 70 per cent of the total wall area, natural lighting being further supplemented by window groups in the steep sections of the roof structure. With the exception of the paint storage house, all operations are carried on within one building having a floor area of more than 516,000 sq. ft., including the oil house. The south end of the building fronts on the ship-channel previously mentioned. At that point, a 540-ft. receiving dock with rail facilities was constructed. Dock equipment consists of a 5-ton revolving gantry crane with a 55-ft. beam, the crane being capable of traveling the length of the dock in less than one minute. Three-phase power is supplied to the crane motors through three rails rather than the conventional copper trolley.

Ocean freight passes from the dock through doorways opening into the receiving bay, which extends across the entire south end of the building. Incoming rail freight also can be unloaded in the receiving bay as trackage is provided both there and by the shipping platforms, which are within the building.

All heavy doors in the plant are motor-operated from push-button control stations located near the opening. Factory windows both in the walls and roof of the building are group-operated by motor-driven gear mechanisms controlled from push-button stations located at points where ventilation control is necessary.

Factory heating and the necessary steam requirements for the plant are furnished from a boiler room wherein are installed two boilers utilizing natural gas for fuel. The heating system of the factory is of the hot-water re-circulating type, water being heated in steam heaters located in the boiler room and circulated through the plant by turbine or motor-driven pumps.

Power is furnished to this plant through two overhead feeders from separate Pacific Gas and Electric Co. substations. These overhead lines terminate in cable potheads outside the plant and are led by cables to the primary switchgear room where a General Electric metal-clad switching unit is installed. This unit is of the elevating type and provides preferential throw-over protection on incoming primary feeders. Two motor-operated primary breakers connect either the preferred or emergency 11-kv. feeders to the 11-kv. bus from which energy is supplied to two separate transformer banks through manually operated breakers. A complete metering installation is included with the unit. These four breakers, the 11-kv. bus, and the metering equipment are constructed as an integral unit, it being necessary to connect only the incoming and outgoing leads after the equipment is in place. This is one of the few metal-clad switching units now in use on the Pacific Coast, but its many advantages presage rapid acceptance of this type of installation. Its use permits lower installation cost, decreased floor space, increased reliability of service and decreased hazards to operating personnel, it being impossible to touch any live part of the high-tension circuit.

Adjacent to the switchgear room is the transformer bay where two banks of three transformers each serve power and light, respectively. These transformers are solidly connected to their respective buses, the power banks rated at 1,500 kva. being connected Delta-Delta, transforming 11-kv. primary power to 440-volt, 3-phase for power distribution throughout the plant.

The lighting bank, rated 1,000 kva., is connected

Exterior of the Richmond Plant of the Ford Motor Company

Power and lighting distribution switchboard, made up of air circuit breaker panels, are safe, neat and easily accessible for changes or maintenance

11-kv. Delta on the high tension side, transforming to 220/110 volts; 3-wire, single-phase. Secondary leads from each bank lead to the main distribution switchboards.

Distribution switchboards are composed of I-T-E dead-front air circuit breakers, 25 serving power and 22 serving lighting. Power and lighting feeders leave the distribution switchboard room at one point in exposed conduit. A particularly important feature of the electrical feeder layout is the maintenance of a uniform gradient throughout the plant regardless of the type of manufacturing process being carried on. Electrical distribution for both lighting and power is made on the basis of watts-per-square-foot, rather than on the basis of power requirement for a particular manufacturing process being carried out at any certain point. Thus, no matter what rearrangement of the plant may be necessary for future models or enlargements, ample power and lighting service will be available without necessitating the expense of a change in the existing electrical installation.

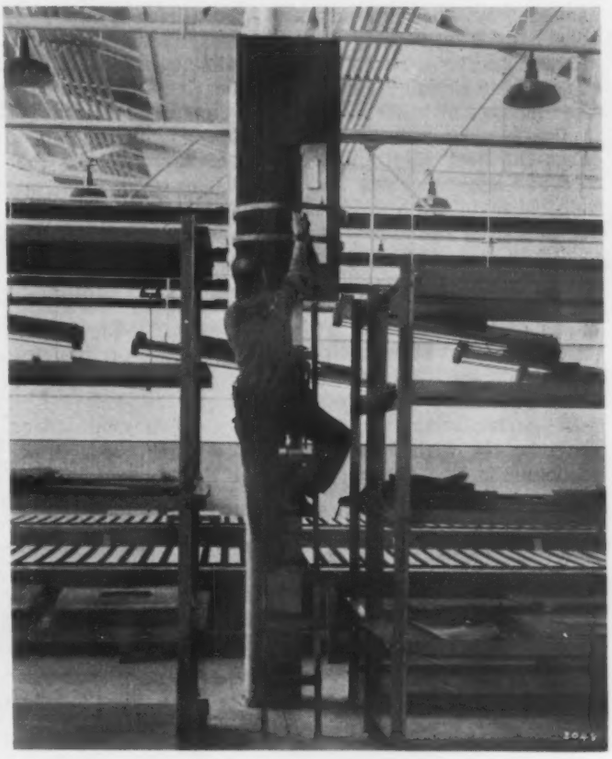
In providing uniform energy distribution to the various factory areas, a corresponding uniformity was necessary in the layout of distribution panelboards. As the power and lighting services are completely isolated, each is distributed through a separate system of panelboards.

Distribution panelboards consist of a number of dead-front fuse blocks which are held in place by clips engaging in jaws on fuse blocks mounted in the interior of the panel. As these fuse blocks are removable, circuit isolation is positive and re-fusing is made less hazardous.

At the Richmond plant, the location of the distribution panelboards is distinctly new. As the accompanying illustrations show, they are mounted at a height of approximately 8 ft. above the floor line, either on the wall or supporting columns throughout the area of the plant. In the latter case, it was general practice wherever possible to place the lighting and power distribution panels on opposite sides of the same column. Panelboards are accessible only by a collapsible ladder which is padlocked into the supporting column, the key to which is in the possession of the electrician, thereby preventing the

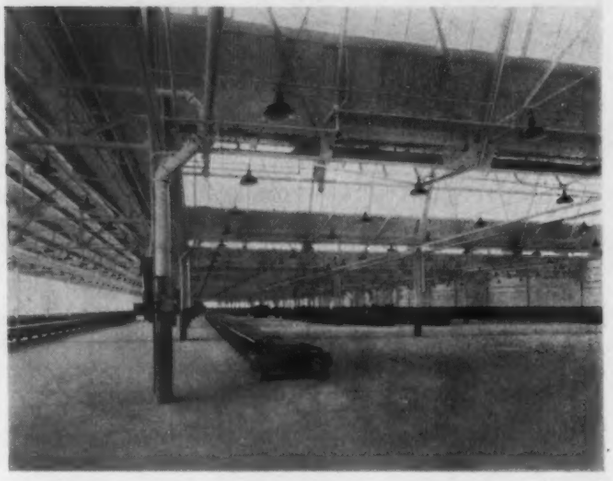
Above—Power and lighting panels are installed above floor to conserve space and promote safety. Padlocked ladders on each column may be seen

Below—Method of working on panelboards. Collapsible ladder has been unlocked and fastened into position before the panel



Left—Close-up of an individual reflector showing the plug and receptacle with which each is equipped, the individual hanger and the steel messenger cable which supports the conduit and prevents sway. These features permit rapid and economical revision of the plant lighting should future requirements make that necessary

Below—View of section of the factory which illustrates the general illumination lighting fixtures and the uniform mounting and spacing to provide even intensity throughout



ladder from being used for any purpose other than reaching the panels. The ladder, when opened, engages in a recess slot in the front of the panel and cannot be jarred or knocked loose. Encircling the working space in front of each panel are two steel bands which eliminate the possibility of accidents due to falling from the high position. This arrangement not only saves a great deal of floor space but also insures that there will be no tampering of the fuses or circuits except by authorized persons.

Power circuits from the main distribution switchboard room serve two distribution panels and lighting circuits serve a similar number of lighting distribution panels.

Lighting, as previously mentioned, is based on a wattage-per-square-foot of floor space and uniform illumination throughout the plant has been the object of installation. With the exception hereafter described, the general lighting is provided by approximately 2,700 18-in. R.L.M. units, mounted at a 20-ft. height on 10- to 14-ft. centers throughout the plant. In general each unit is provided with a 300-watt lamp. Dome reflectors are suspended from the roof and are provided with a removable hanger and plug attachment. These individual hangers and connections for each reflector facilitate easy removal for cleaning and provide means of changing the size and type of reflector and lamp should future changes in the factory require a different type of lighting to effect the best results. Because of the saw-tooth roof construction, reflectors had to be suspended some distance to maintain a uniform height, which was specified not to exceed the lowest truss line in any instance. To eliminate sway and to carry lighting conduits across the wide spaces, the conduit is suspended from steel messenger cables carried between trusses along the entire length of the building. This arrangement also permits standardization of mounting details. The accompanying illustration emphasizes the perfection of uniformity and the details of mounting each reflector.

In the receiving bay, 66 Holophane units mounted on 40-ft. height with 750-watt lamps are installed. Holophane units also are used to light the railway loading dock and the craneway.

Along the assembly line and for the various body painting sheds, Cooper-Hewitt mercury vapor lamps supplement the general illumination. These lamps are mounted on either side of the assembly line and the total installation requires over 400 mercury vapor units, each rated at 450 watts. Illumination from these lamps is particularly desirable along the body finishing assembly line. As the bodies leave the assembly line for their first priming coats of paint they enter a glass enclosed painting booth where illumination is provided by specially mounted dome reflectors on the outside of the glass, thereby eliminating any possibility of explosion within the paint chamber itself. Spray painting is used exclusively in this plant. In successive progress toward completion, the illumination of the paint chambers is provided by Cooper-Hewitt lamps to enable colors to be exactly matched and to eliminate shadows or lines on the paint job itself.

The total lighting load in this plant is 999 kw. According to modern ideas, lighting should cost approximately 2 per cent of the factory payroll. In other words, lighting will cost ten minutes of the working time during the day and, to justify its installation, should enable the worker to increase the speed in production at least this much. In the Richmond plant, an average 10 foot-candle intensity is maintained and great care has been exercised in designing the lighting installation to fit the requirements of each process and to make working conditions as favorable as possible.

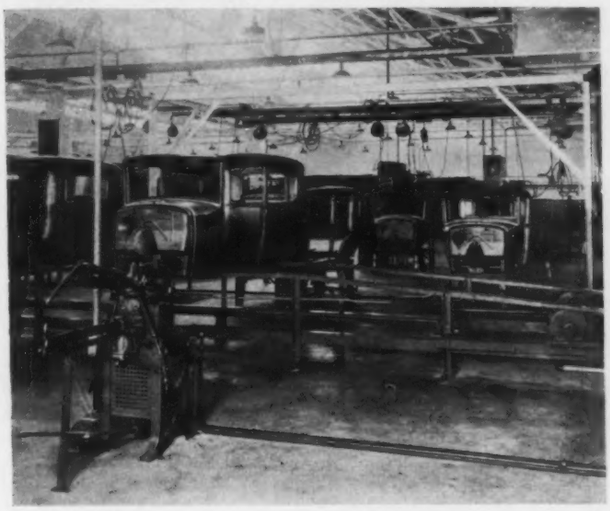
Power requirements within the plant include the operation of everything from automatic welding equipment to high-frequency portable tools. Except in the case of very small machines, individual circuits are provided from the power-distribution panels to each motor or equipment.

Production via the famous continuous line assembly is carried out to a high degree of perfection. Material handling has been reduced to a highly mechanized system, motor-operated conveyors being so synchronized as to assemble the component parts of an automobile or truck at the required point in the production line exactly at the right time. For this purpose an elaborate combination of motor and gear reducers is used to drive the conveyors. The automobile engine is received completely assembled from the Eastern factory. However, the frame and body parts are assembled in this plant. For these operations, riveting and electric welding are used to great advantage. Specially designed spot welding machines weld entire sections of the body in one operation. Individual spot welding machines are used for the smaller parts of the body assembly.

Along the various assembly lines, high-speed tools are used to speed production. Frequencies of 60 or 180 cycles are obtained from a small frequency changer installation, the current being made available through a separate conduit system at points where exceptionally high-speed tool equipment is necessary.

Portable tools, which include drills, screw drivers, grinders, buffers, polishers and wrenches, are available to operators along the assembly line at any required moment by means of an ingenious carrier suspension. An I-beam, mounted above the assembly line, forms the tracks for a number of four-wheeled suspensions approximately 12-in long. Each such suspension provides the mobile support of one portable tool which is energized from outlets on a conduit installation immediately above the I-beam. Spring-wound drums for the flexible conductor insure that the tool will remain out of the way, yet available for instant use.

Individual motor drives are provided wherever possible throughout the plant. The unit principle of machine-tool drive is carried one step further by combining the disconnecting switch, magnetic starter, push button and motor itself as a unit part of the machine. This system has the advantage of added simplicity in wiring as only one conduit is required to serve each motor. Furthermore, removal or replacement of a machine can be made with the least amount of trouble and expenditure of time. The combination presents a neat, compact appearance on the machine and makes the electrical equipment very accessible for repairs or replacements.

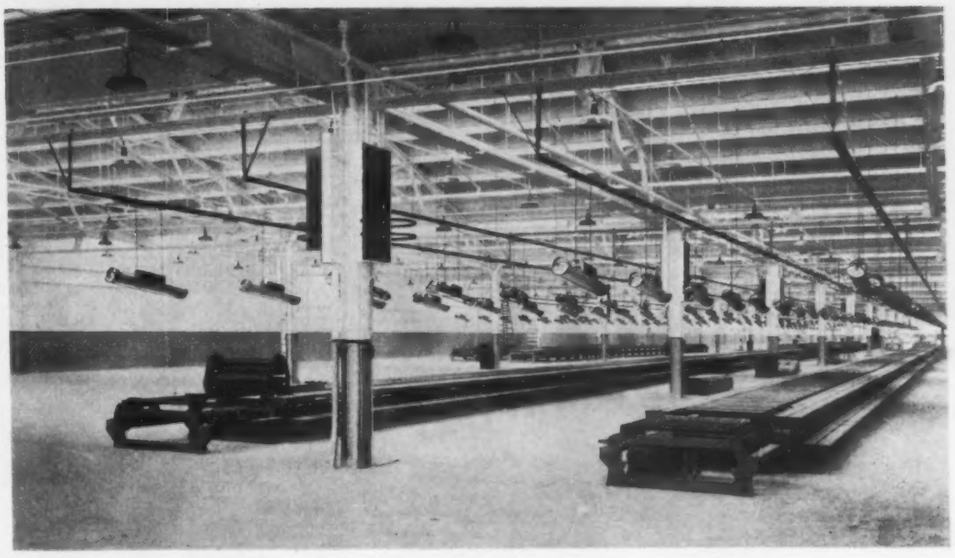


Approximately 200 motors, ranging from fractional horsepower sizes to 150 hp., are installed in the plant. With the exception of one or two smaller motors, control is of the magnetic, push-button type. Motor disconnecting switches are fused when an installation is one of a number on a single feeder and is unfused when the service runs directly to the distribution panelboard.

Detached from the plant is the paint-storage and paint-distribution equipment, which is interesting from the electrical viewpoint in that vapor-proof lighting units are the only electrical equipment in the building. In the Richmond plant a new system of paint distribution has been installed. Sixteen tanks in the paint-storage house contain the standard colors used by the company on its products. These tanks are continuously agitated and kept under pressure by means of compressed air or steam-driven pumping units. From each storage tank paint is forced through pipes to various factory areas where it is utilized on the body of the car. This differs from the ordinary re-circulating system in that there is no return from the factory to the storage tanks, settling of the paint being prevented by pressure and agitation within the lines themselves. In enameling fenders and under-body parts, drying is accomplished in hot-air ovens. Total tank capacity in the oil house is 199,000 gal.

Natural gas is used to heat the air and the temperature is closely controlled by Leeds & Northrup temperature controllers acting upon gas control valves for the heaters. Motor-driven fans maintain constant circulation of the warm air, thereby evening out the temperature within the oven.

Throughout the entire plant no detail which would improve working conditions or make for more efficient production has been overlooked. In these respects, as in many others, the Richmond plant sets a new standard for industrial installation. Electrically it represents the most advanced practices in the application and utilization of energy, the original electrical installation being so laid out that it can be adopted to almost any conceivable change in manufacturing requirements with minimum expense. Albert Kahn, Inc. were the architects and engineers of the plant; the Clinton Construction Co., of San Francisco, the contractors; and the Alta Electric Co., of that city, made the electrical installation.



Above——Body assembly requires a variety of portable tools which are carried along the assembly line on small suspensions. Spring return reels hold each tool in readiness for use. One of the many spot welding equipments is shown in the foreground

Right—General view of two assembly lines shortly after completion of building. Details of general illumination installation and the mercury vapor lamps along the conveyors are clearly shown. Note location of lighting distribution panels on columns

A Department for the Industrial Electrical Contractor — the Motor Specialist

MOTOR FORUM

An Exchange of Ideas on Economic Electrical, Mechanical and Business Problems

Plotting Motor Performance From Field Readings

By W. O. HURLBUT
San Francisco, Calif.

PERFORMANCE characteristics of an induction motor may be obtained in the field if an ammeter and a suitable means for determining the resistance between two of the stator leads are available. This method is particularly applicable for installations such as isolated pumping stations where a watt-hour meter is conveniently located on the premises. Watt readings may be derived from this meter by timing the disk revolutions and applying the constants given in the accompanying table which is made up for the various watthour meters in common use.

The following discussion demonstrates how readily an approximate solution of three-phase induction motor performance can be calculated assuming that the supply circuit is reasonably balanced. Motor losses will be divided into the three parts of rotor copper loss, stator

Graphical representation of operating characteristics of the same motor at full load (Chart No. 1.) and locked rotor (Chart No. 2). The abscissa axis is a watt scale selected at an arbitrary vlue convenient for the motor under consideration. The watt scale must be identical for each chart if a graphical torque comparison is desired

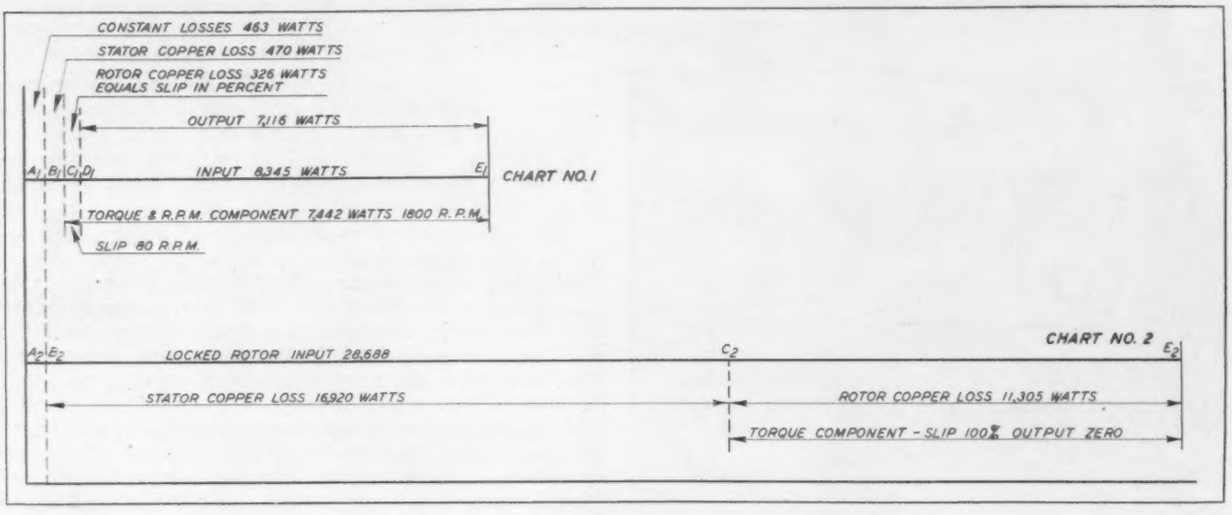

CONSTANT LOSSES 463 WATTS
STATOR COPPER LOSS 470 WATTS
ROTOR COPPER LOSS 326 WATTS
EQUALS SLIP IN PERCENT
OUTPUT 7,116 WATTS
INPUT 8,345 WATTS
CHART NO. 1
TORQUE & R.P.M. COMPONENT 7,442 WATTS 1800 R.P.M.
SLIP 80 R.P.M.
CHART NO. 2
LOCKED ROTOR INPUT 28,688
STATOR COPPER LOSS 16,920 WATTS
ROTOR COPPER LOSS 11,305 WATTS
TORQUE COMPONENT - SLIP 100% OUTPUT ZERO

TABLE FOR COMPUTING HORSEPOWER OR KILOWATT DEMAND FROM DISC REVOLUTIONS

of 60-cycle, 2-element, polyphase watthour meters

Meter kw. = r.p.m. × K × 0.746 Meter hp. = r.p.m. × K (Table gives values of K)

METER SIZE	GENERAL ELECTRIC									WESTINGHOUSE			SANGAMO					
	D-3			D-6, D-7			D-14			O.A., O.B.			H			H.C.		
AMPS	110	220	440	110	220	440	115	230	460	115	230	460	110	220	440	110	220	440
5	.0483	.1005	.2011	.0483	.0965	.1930	*.0965	*.1930	*.3861	.0536	.1072	.2145	.0335	.0670	.1340	.0536	.1072	.2145
10	.1005	.2011	.4021	.0965	.1930	.3861	.1930	.3861	.7721	.1072	.2145	.4290	.0670	.1340	.2681	.1072	.2145	.4290
15	.1609	.3217	.6032	.1448	.2895	.5791	.2895	.5791	1.1582	.1609	.3217	.6434	.1005	.2011	.4021	.1609	.3217	.6434
25	.2413	.4826	1.0054	.2413	.4826	.9651	.4826	.9651	1.9303	.2681	.5362	1.0724	.1676	.3351	.6702	.2681	.5362	1.0724
50	.4826	1.0054	2.0107	.4826	.9651	1.9303	.9651	1.9303	3.8606	.5362	1.0724	2.1448	.3351	.6702	1.3405	.5362	1.0724	2.1448
75	.6032	1.2064	2.4129	.7239	1.4477	2.8954				.8043	1.6086	3.2172	.5027	1.0054	2.0107	.8043	1.6086	3.2172
100	1.0054	2.0107	4.0215	.9651	1.9303	3.8606							.6702	1.3405	2.6810	1.0724	2.1448	4.2895
150	1.2064	2.4129	4.8257	1.4477	2.8954	5.7909							1.0054	2.0107	4.0215	1.6086	3.2172	6.4343

NOTES: (1) * 5 Amp. separate terminal meter same as D-6, D-7.

(2) On installations using current and/or potential transformers "K" must be multiplied by product of ratios of transformers.

(3) All of the above meter constants "K" apply to 50 cycle meters, except type I.

(4) The above constants when applied to formula gives Meter H.P.
To determine motor output efficiency of motor must be considered.

copper losses, and constant losses, the latter consisting of friction, windage and iron losses. Actual readings are the basis for the calculations.

INPUT READINGS

Idle.....Watts	469 (w)	Amperes 5.6 (I_1)	r.p.m. 1,800
Load.....Watts	8,345 (w)	Amperes 24 (I_2)	r.p.m. 1,720
Locked rotor....Watts	28,688	Amperes 144	

Resistance between stator terminals 0.544 ohms (R)

Constant losses $= w - (I_1^2 R \times 1.5 = 469 - (5.6^2 \times 0.544 \times 1.5)$
$= 443$ watts

Load stator copper loss $= I_2^2 R \times 1.5 = 24^2 \times 0.544 \times 1.5$
$= 470$ watts

Locked stator copper loss $= 144^2 \times 0.544 \times 1.5 = 16{,}920$ watts

As the rotor copper loss is proportional to the slip in speed, its value may be derived and graphically subtracted from the input as shown in chart No. 1 The remainder, d_1e_1, is proportional to the output, or 7,116 watts.

Since the torque varies proportionately with the output plus the rotor copper loss, its representative value will appear as the distance c_1e_1, and in terms of pounds at one foot radius is:

$$\frac{\text{Watts output} \times 7.06}{\text{r.p.m.}}.$$

Then from the values in chart No. 1 we have:

$$\frac{7{,}166 \times 7.06}{1720} = 29 \text{ pounds.}$$

Chart No. 2 is drawn to the same scale as chart No. 1 but from the locked rotor readings. As mechanical torque is proportional to the component, ce, the starting torque may be determined by comparing c_1e_1 at load with c_2e_2 locked. Running torque has already been calculated as 29 lb. Therefore the torque at locked rotor is:

$$\frac{c_2e_2}{c_1e_1} \times 29 \text{ or } \frac{11{,}305}{7{,}412} \times 29 = 44 \text{ lb.}$$

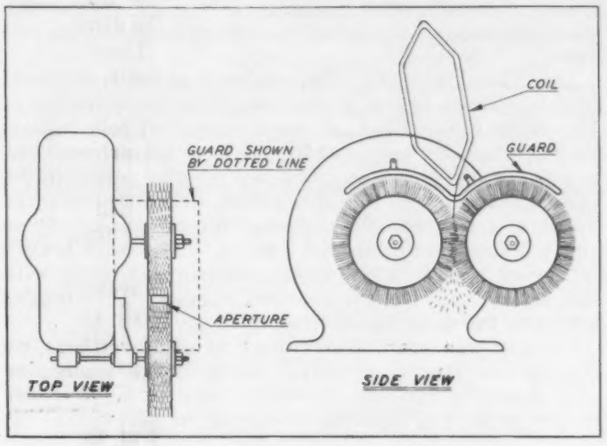
▼

Scraping Enameled Magnet Wire

MUCH of the advantage in using cotton-covered enameled conductors for motor coils is lost because of the excessive time consumed in scraping coil terminals for soldering. The time lost in scraping by hand becomes an important cost factor, especially when the coil is made up of multiple conductors.

The device illustrated has been made in a repair shop and handles up to ten No. 15 wires in a single operation. The coil terminals, as shown in the sketch, are thus cleaned for soldering previous to placing the coils in the stator, armature or core, as the case may be.

The wires become perfectly cleaned the instant they are inserted between the buffing wheels. The time involved in the operation is really only that of handling.



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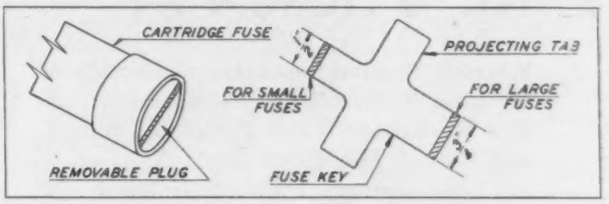
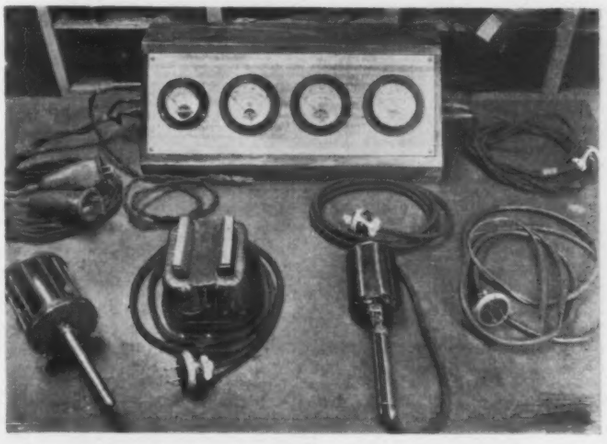
Handy Tool for Fuse Renewing



OFTEN it becomes difficult to remove the screwed-in ends of cartridge fuses of the renewal type, particularly after they have been in use for some time, as the slot in the fuse ends is too large to permit an ordinary screwdriver to obtain hold. This is especially true if the metal end of the fuse has become corroded, or was wedged in too tightly when the fuse was assembled. In the accompanying illustration is shown a special fuse key with ends that will fit either the large or small size cartridge fuses. It is made from a flat piece of 1/16-in. thick steel or other hard metal, and the two key ends are sharpened to fit the slots in the fuse caps. The projecting tabs on each side of the tool form the handles for turning it.

▼

Test Instruments By Backstrand



WHENEVER the implements at hand prove inadequate, Backstrand Bros., motor specialists of Riverside, Calif., let their ingenuity have full rein and soon there evolves a new implement. A few of the test instruments kept at the repair bench, made by themselves, are shown here. At the top is an instrument board, with leads for connection to power supply or to the equipment to be tested. Below, left to right, are a "squirrel cage" or free wheeling testing rotor, which placed inside the stator of a small motor will revolve if the winding is correct. Next to it is a small "growler" for testing failures in small rotors. Then comes a hand "growler" for testing for failures inside a stator frame. Last is a set of test leads with pointed ends and insulated handles.

In Times Like These . . .

When It Became Necessary to Get More Business, Spokane's Electrical League and The Washington Water Power Co. Tested and Proved This Formula: Coordination of Effort + Sales Promotion = More Business

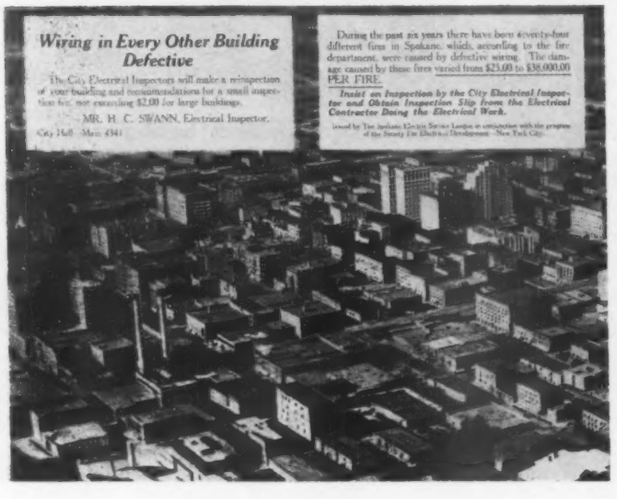
By LADNER V. ROSS
Illumination Engineer,
The Washington Water Power Company, Spokane

IN YEARS of normal or exceptional business activity, large increases in sales or business volume are obtained comparatively easily and with slight attention to proper organization of effort. In The Washington Water Power Co.'s territory lighting sales efforts in the past had been largely of the unorganized type—attention to calls as they came in. Little more could be done by the one man in the lighting service bureau, considering the sweep of new construction and remodeling through the years of prosperity.

However, with the slackening pace of business and with subnormal building, it became evident that the time was at hand to gird for battle if the electrical industry were to get its fair share of the builders' dollar. So, with the limited assistance of a few Spokane Electrical League members, we pressed forward in 1930 and 1931 with promotional activities and cooperative trade improvement plans, the better to sell improved electric lighting.

To obtain the best results, both for the central station in its load building and for the contractor in his work program, such a promotional lighting program should be many sided. It should embrace all prospective fields alike, to the exclusion of none, in order that the load growth and the additional contracting work be normal. Thus, our 1930 program included promotion on the reinspection and modernization of commercial and industrial establishments, a convenience outlet campaign for homes, an adequate wiring campaign for new construction, and provisions for such specials as outdoor Christmas lighting. During last year, however, this program was curtailed in that no direct-mail advertising was used and no wiring specials were offered by the league.

Three thousand of these general reinspection letters were mailed at the start of 1930 to all prospects—factories, office buildings, business houses, hotels and apartments


Wiring in Every Other Building Defective
The City Electrical Inspectors will make a reinspection of your building and recommendations for a small inspection fee, not exceeding $2.00 for large buildings.
MR. H. C. SWANN, Electrical Inspector.
During the past six years there have been seventy-four different fires in Spokane, which, according to the fire department, were caused by defective wiring. The damage caused by these fires varied from $25.00 to $38,000.00 PER FIRE.
Insist on Inspection by the City Electrical Inspector and Obtain Inspection Slip from the Electrical Contractor Doing the Electrical Work.

Specific letters followed the general broadside

The FOOTLIGHTS of a SELLING SHOW
Is the "Game Called - on account of darkness" in your factory.....
The RENT LINE follows the LIGHT LINE
PRODUCTIVE LIGHTING
is no longer guesswork
CO-OPERATIVE DIRECT MAILING

DIRECT MAIL

In order to obtain prospects, more than 10,000 lighting sales letters were mailed out at the first of 1930 on the subject of reinspection, store lighting, industrial lighting, and office lighting. The letter on reinspection was prepared locally and went to a list of 3,000 business houses, factories, office buildings, hotels and apartments. An illustration of this direct-mail piece appears with this article.

Letters on store lighting consisted of the well-known Franklin series of three, prepared under the direction of The Society for Electric Development. These letters, with special copy approved by our local league, went out to a list of 500 stores during a two months' period in the early spring, a total of 1,500 letters. Next followed the Franklin series on office lighting, directed primarily to 100 building managers and owners. The local branch of one of the electrical supply companies tied in with this activity and mailed an equal number of their sales letters to the same list of prospects.

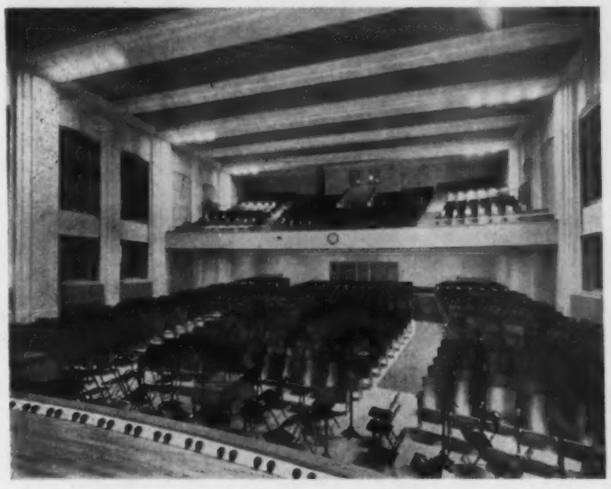
Later in the year (about the first of November) we started the largest electrical direct-by-mail campaign ever staged in Spokane, sending a total of 5,000 letters to 300 industrial lighting prospects in six weeks. It

was really four campaigns in one, as each of the three largest manufacturers of industrial lighting equipment cooperated with the league campaign with additional mailings. Also, local electrical contractors sent 1,400 tie-in letters to their own industrial customers at the same time.

Actual prospects developed by these letters were turned over to contractors for selling because of the lack of adequate man-power in the league or in the power company bureau. The results satisfied everyone and paid for the cost of advertising many times over. In fact, the effects of the intensive campaign were still being felt in 1931.

Convenience Outlet Campaign

Since modern lighting in the home is largely effected by means of portables—floor lamps, table lamps, bridge torchiers, lighted ornaments and sunlamps—it is logical to include a convenience outlet campaign in any well



Auditorium of the John R. Rogers high school, with built-in units plainly visible

rounded out lighting program. Terms were arranged in conference between the contractors and the power company; two duplex convenience outlets were installed in any home for $11.85 and additional outlets at $3.85 each. The terms included a down payment of 85 c. and the payment of the balance at $1 per month with the light bill, no contract to exceed twelve months. Two dollars out of each order for two outlets and 35 c. out of each order for an additional outlet was placed in a fund to cover the cost of newspaper advertisements run by the power company. Further, the power company distributed post cards to each of its 20,000 residential accounts in Spokane calling attention to the special. The eight residential salesmen of the power company were asked to mention the special on every one of their hundred or more daily contacts and they were responsible for a large portion of the orders turned in. All orders thus obtained were distributed equally among the nine contractors cooperating.

Direct Mail Pieces, 1930

Subject	Sender	Total
Reinspection	League	3,000
Store lighting	League	1,500
Office lighting	League	300
Office lighting	Westinghouse	300
Industrial lighting	League	900
Industrial lighting	Benjamin	900
Industrial lighting	Ivanhoe	900
Industrial lighting	Westinghouse	900
Industrial lighting	Contractors	1,400
Total		10,100

The contractors themselves entered in this advertising and canvass by using newspaper space, radio time, street car cards and hand bills. A total of 334 duplex convenience outlets were installed.

Franklin Lighting Specifications

To gain additional prestige for the lighting recommendations prepared by the lighting service bureau, a license was obtained in 1930 in the name of the Spokane Electrical League from The Society for Electrical Development, Inc., to use the Franklin Lighting Specifications Plan. At first, when we made Franklin layouts, they were just the usual lighting plans plus a red and black certificate on parchment. Later, we began to offer complete electrical wiring specifications, including wiring for power and heat, to comply with the Franklin lighting layout.

Of course, electrical specifications are not a part of the Franklin plan, but in our experiment here we found that they not only gave us a better access to the architect's office, but that they also were a means of obtaining a continuous connection with a job all the way from the draftsman's board to final completion.

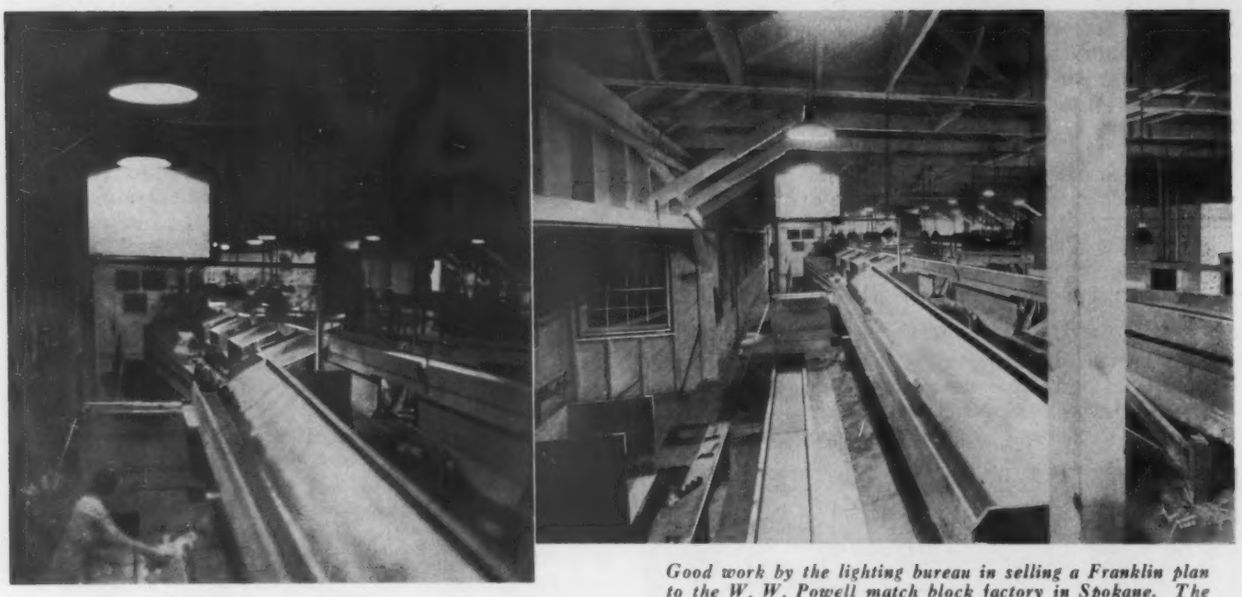
A striking example of the possibilities of selling adequacy occurred in the case of two schools built in the suburban territory near Spokane. Both were designed by local architects and both were built under extremely stringent financial limitations. One of them was contacted by our lighting service bureau and a Franklin specification prepared, including wiring, while the other was not contacted in any way. One was wired in knob and tube with two ceiling outlets per classroom and one wall switch and no convenience outlet. The other was wired in conduit with six to eight ceiling outlets per classroom, a switch at each door, a minimum of two convenience outlets and an outlet for a synchronous electric clock. In the one we contacted, each individual

Indirect units were used in other parts of the school (excepting the auditorium) where they were more accessible from below

ceiling outlet was equipped with double the size of lamp, not counting the greater number of outlets per room.

Another interesting job was the new John R. Rogers high school in Spokane. In the offices, library, study hall, art room, music room and bookkeeping room, a total of 50 indirect units of 300-watt size have been installed. The remainder of the rooms are equipped with enclosed semi-indirect units of the same size. No lighting fixtures, in the usual sense of the word, have been used in the auditorium. The entire room is lighted with built-in units (see illustration) and relamping and cleaning is done from a cat-walk in the attic space, eliminating the use of long ladders, lamp changers or scaffolding.

Other unusual electrical features in this school include a complete Telechron clock and program system, eliminating



Good work by the lighting bureau in selling a Franklin plan to the W. W. Powell match block factory in Spokane. The effectiveness of good lighting is evident

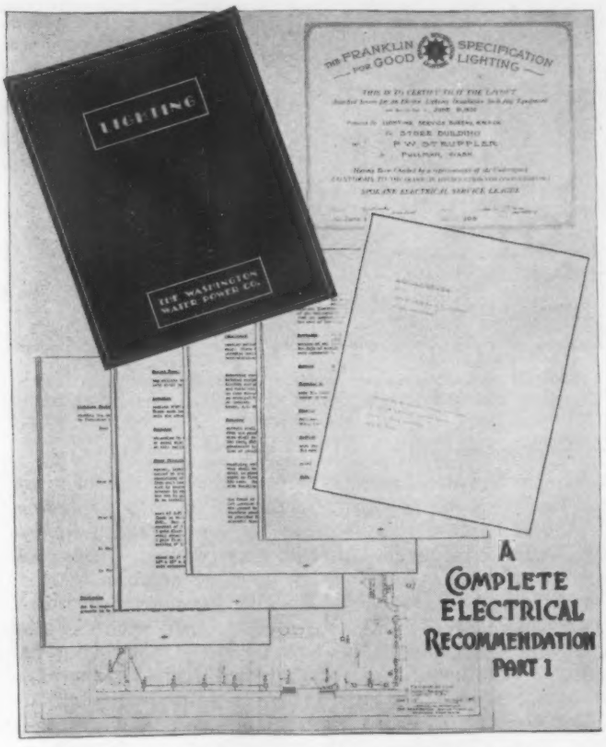
all paper tapes; a radio broadcasting system connecting classrooms with the office, auditorium or outside world; forced air circulation with automatic temperature control for each room; all-electric kitchen in the cafeteria and domestic science room; special convenience outlet circuits throughout; and electrical distribution panels separate from lighting panels at all load centers.

During 1930 we issued Franklin layouts for installation certificates on eighteen different jobs, ten of them new construction or remodeling, while the other eight involved relighting only. Reports are available on eleven of these jobs, the remainder being either delayed or not entirely completed at the time of writing. On these eleven the lighting load increases total 128 kw., of which 96 kw. may be reasonably attributed to the selling efforts of the lighting bureau.

During 1931 we made Franklin lighting and wiring layouts for 24 jobs. Of these, 19 are completed and in use. On these 19, load increases total 278 kw., of which 116 kw. may be attributed to the bureau.

These figures for 1930 and 1931 do not represent the full activities or results of lighting sales efforts, but merely that part where the Franklin plan could be applied advantageously. For instance, last year we reported lighting sales on a total of 65 jobs, including the 19 mentioned, for an increase of 1,052 kw. This includes total increase on some new construction so that the bureau takes credit for only 465 kw.

The outstanding success of this limited experiment concurs with the opinion of lighting salesmen and equipment manufacturers throughout the country today that inadequate wiring is the root of all evil in the lighting sales field and that successful lighting sales effort must include wiring sales as an integral part.


LIGHTING
THE WASHINGTON WATER POWER CO.
THE FRANKLIN SPECIFICATION FOR GOOD LIGHTING
A COMPLETE ELECTRICAL RECOMMENDATION PART 1

Franklin specifications normally include lighting only, but the bureau went further and supplied layouts for power and heat. Thus, a complete electrical recommendation involves three parts. This requires more work, but gets more business

Outdoor Christmas Lighting

Although very little money was spent on this activity for the year, results were far beyond expectations. In previous years elaborate contests had been staged with extensive publicity programs. This year, with no contest feature, greatly curtailed newspaper space and practically no money spent by the league, the number of homes lighted, the neighborhood spirit and the number of commercial establishments lighted equaled any previous year's record. Direct-mail circulars were sent by some of the electrical contractors to their customers and a playlet, "The Light Before Christmas," written in 1929 for the league, was again presented before civic clubs.

Ninety per cent of the educational, promotional and sales work of the lighting service bureau of the power company has been done in close cooperation with the electrical contractors and other branches of the industry. The report of this bureau's first year of intensive promotional work (1930) shows 171 customers' lighting jobs worked on, with 55 written recommendations prepared. The bureau worked on 21 temporary lighting jobs and on 31 company lighting jobs, for a total increase of 625 kw. for the year. The total increase in revenue

is estimated at $28,959, of which $13,470 can be credited to lighting service work.

During 1931, the bureau reported lighting sales on 65 jobs with 24 Franklin certificates issued, for an increase of 1,052 kw. This represents approximately $52,500 in annual revenue to the central station, but it includes new construction so that the bureau takes credit for $23,250. Total connected lighting load from the 19 completed jobs under the Franklin plan represents $13,900 a year in revenue.

If we review the highlights of these different activities, with the limited man power, the small population of this city and region, and the slackened business pace during the year, only the most optimistic outlook can be foreseen for the future returns from this combined work.

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Price Books Revised To Meet New Conditions

Resale Price Services Render Valuable Aid to Pacific Coast Contractors

STANDARD for many years as "the black book," and used by contractors throughout the West, the "Electrical Price Book," formerly known as "Pacific Coast Data and Sales Book," has been revised and rearranged to conform with more modern practice. At the same time, in southern California another and more abridged price book service has been inaugurated. Both have definite fields of service to the contracting industry although they differ in some essentials.

The latter, for example, was the outgrowth of the need for a brief, easily used pricing sheet which the contractor doing knob and tube work could take on the job, use to make estimates of price for a customer, and quickly compute the data required. It is published personally as a private enterprise, by Frank J. Connolly, who is executive secretary of the Contractors and Dealers Assn. of Southern California. It is know as the "Electrical Supplies Price Service."

This particular book is of pocket size and contains only the standard everyday items in simple form. The price quoted is sufficient to take care of normal overhead and profit. The sheets are mimeographed on one side of a page and are arranged with alphabetical index in a loose-leaf, pocket-size book binder. A large number have been sold in southern California.

The "Electrical Price Book," on the other hand, is a more complete service. It is published by the A. E. Rowe Co., of San Francisco, which has handled the service for years. This book is issued in two sizes, one a pocket, abridged size; the other a desk or counter size, more complete in detailed information.

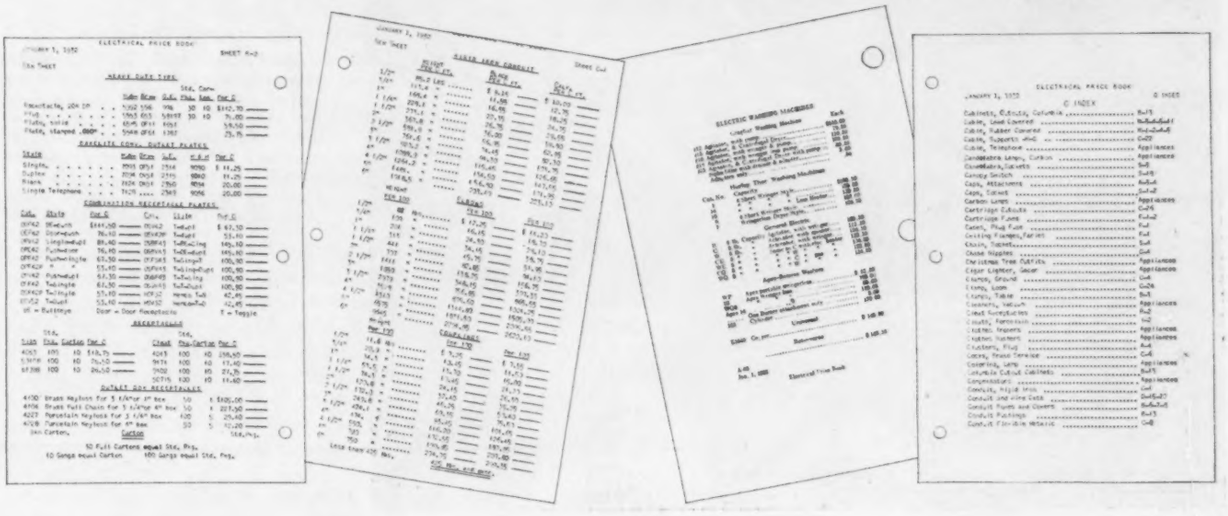
A separation of nationally advertised list-price materials and appliances is made by printing the sheets containing these items on pink paper. They are also kept in a separate part of the binder.

Wiring material suggested resale prices are based on a uniform make-up from carton quantity cost usually. At the bottom of each page are listed the various quantity lots available. The one underlined with two lines is that upon which the prices given on that page are based. (See illustration.)

The indexes are all carefully cross-indexed so that if an item is known by several designations it may be readily found. For example, cartridge fuses are indexed both under "cartridge" and "fuses."

On the price sheets themselves the sizes, weights, quantities and, where several makes of the same item are common, the makes and their catalog numbers and descriptions are given. This gives the contractor several choices of approaching each item to find its resale price. Likewise, if the book is to be used for estimating purposes and cost figures are required, a blank space is

Typical pages in the price book; left, showing listing of catalog numbers of various makes, styles, etc., with pricing based on carton quantity as underlined on the bottom of the sheets. Conduit prices, as indicated, are based on quantity of 425 lb. Appliance sheets, such as the washer page shown, are printed on pink paper to facilitate finding. A typical index sheet (right) shows cross-indexing of items



provided in the right-hand column for the contractor to enter these figures, either in code or as he wants them.

An advantage of the service is that costs are not divulged to counter clerks or other employees who might misuse them in quoting to their friends. The prices given are all selling prices and promote a consciousness of selling price rather than cost price. As with the other service mentioned, the mark-up is sufficient to provide a fair profit and a normal overhead. The "Electrical Price Book" prices have stood court tests as to the legitimacy of the calculations upon which prices are based.

Two other features of service were announced by Mr. Rowe upon the issuance of the revised book. Maurice de Long, an estimator of long standing in San Francisco, formerly with the Turner Co., has been placed in charge of a technical department. He will answer contractors' questions as to technical problems and advise in installation methods. For any contractor desiring a check quantity survey of materials on any plans and specifications, an hourly fee has been arranged. No estimates of labor will be made, however.

Because of freight differentials and other local conditions, the Pacific Coast states have not been able to rely as completely upon national resale price services as have other parts of the nation. These two resale price services on contractors' time and material installations, even in competitive work, should do much to stabilize this industry, if used.

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U. S. C. Swimming Pool Sports Combination Lighting

SOON the new swimming pool at the University of Southern California will become a place of international interest, for athletes from all parts of the world will play and practice in this pool in preparation for the 1932 Olympic Games, to be staged in Los Angeles. Light will play an important part in these athletes' preparations, as they will be able to swim at night as well as during the day, for the installation of a combination overhead and underwater lighting system was included in the original plans for this pool.

Althought the pool, which measures 62x72 ft., was completed but a short time ago, several swimming events already have been held at night by the students in regular attendance at the university, and the illumination of the pool has been found entirely satisfactory. The combination lighting has also been pronounced safer and more hygienic than the old type of overhead lighting only.

The overhead lighting of the pool itself is accomplished by the use of 24 sets of reflectors, each set consisting of two spots, with each spot containing a 150-watt lamp. These sets are spaced on 15-ft. centers, with the exception of the two center rows, which are 8 ft. apart and are mounted in an inverse position so that the illumination obtained is totally indirect. The conduit for these lights is installed in the channel of the angle-iron girder with an outlet for each pair of spotlights, the latter being connected thereto with flexible cord.

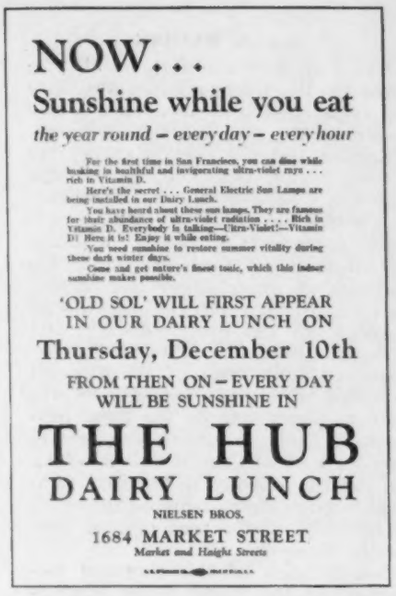
Twenty-two Westinghouse Aqualux underwater lights equipped with rectilinear lenses and 250-watt lamps are used for the underwater lighting of the pool. These are enclosed in a heavy bronze-cast water-tight housing with a glass lens on the water end and a cover similar to that used on a diving bell, which is removable from the corridor in the basement so that lamps may be adjusted or renewed. The unit, however, is designed to be submerged without a water-tight compartment.

The underwater lights are 4½ ft. below the top edge of the pool and are spaced on 12½-ft. centers at the sides and 6 ft. apart at one end. The other end of the pool is left blank, so that swimmers do not race toward the light.

Walks around the pool are also lighted. Four overhanging fixtures each contain 100-watt lamps, while ten wall brackets hold 80 watts each.

The complete electrical installation was laid out and engineered by E. L. Ellingwood, electrical and mechanical engineer, and George L. Patterson was the electrical contractor.

The Trojan tank in full light. Glass forms the roof and may be raised during summer to simulate an outdoor plunge. Such swimming champions as Johnny Weismueller, Mickey Riley, Austin Clapp, Buster Crabbe, Georgia Coleman and Olive Hatch have pronounced the lighting ideal for meets


NOW...
Sunshine while you eat
the year round – every day – every hour
For the first time in San Francisco, you can dine while basking in healthful and invigorating ultra-violet rays . . . rich in Vitamin D.
Here's the secret . . . General Electric Sun Lamps are being installed in our Dairy Lunch.
You have heard about these sun lamps. They are famous for their abundance of ultra-violet radiation . . . . Rich in Vitamin D. Everybody is talking—Ultra-Violet!—Vitamin D! Here it is! Enjoy it while eating.
You need sunshine to restore summer vitality during these dark winter days.
Come and get nature's finest tonic, which this indoor sunshine makes possible.
'OLD SOL' WILL FIRST APPEAR IN OUR DAIRY LUNCH ON
Thursday, December 10th
FROM THEN ON – EVERY DAY WILL BE SUNSHINE IN
THE HUB
DAIRY LUNCH
NIELSEN BROS.
1684 MARKET STREET
Market and Haight Streets

Above—These dodgers brought increased business. Right—Interior of The Hub, with Stephen Winter, G. E. sunlamp specialist, in dark suit facing camera

Vitamin D With Victuals

WITH a brand new installation of two rows of specially built dual-purpose lighting units, The Hub Dairy Lunch is the first restaurant in San Francisco to offer a treatment of ultra-violet rays with every meal. And the subsequent increased business indicates that even Californians are willing to accept guaranteed daily sunshine. The heart of each unit is an S-1 Mazda sunlamp, concealed by a 20-in. diameter parchment shade having the G.E. monogram and a rising sun as its decorative motif. In addition to the sunlamp, four 60-watt inside frosted lamps are concealed within the shade. The eight units are suspended 8½ ft. above the floor in two rows and replace one row of four candlestick fixtures.

Because Stephen Winter, General Electric sunlamp specialist, and Carl Henkle, of Lambert Sales Co., General Electric retailer, occasionally lunch at The Hub, they became acquainted with the brother proprietors, A. C. and S. C. Nielsen, and suggested such an installation. But it was not until after considerable promotion and persistent effort that they were able to consumate the sale.

So pleased were the proprietors after the job was done that they distributed the illustrated dodger, calling attention to the innovation and its benefits.

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Clears Legal Points Regarding Licensing

TO CLEAR some opinions regarding the much-disputed prerogative of those administering licenses, H. B. Kirkland and A. L. Abbott, of the National Electrical Manufacturers' Assn. ordinance department, propounded two legal questions which have been answered by Francis E. Neagle, attorney of New York City. The two questions were:

No. 1. Assume that an examining board is created and is given power to examine applicants for electrical contractors' licenses, to issue licenses to those applicants found qualified, and that it is desired to give the board power also to revoke such licenses.

Is there any legal ground for revocation of a license other than proved willful and persistent violation of laws regulating methods of installing electrical work or proved incompetence to comply with such laws? Or may the board in the revocation of licenses legally take into consideration the moral character, business integrity, financial responsibility, etc., of the holder of the license?

No. 2. Where a new licensing ordinance or statute goes into effect requiring the licensing of electrical contractors and journeymen electricians, is it necessary that a contractor already engaged in the business and each journeyman already working at the trade as a journeyman be given a license without examination?

In answering the questions, the attorney cited cases having a bearing upon the matter in hand. In short, the answer to the first question was: "As there is no obligation on the licensing authority to grant any licenses and as it has the power to refuse a license in a particular case even where the statutory or preliminary requirements are complied with, it is my opinion that a license can be revoked for other reasons than willful and persistent violation of the law or proved incompetence, and that the licensing authority may take into consideration moral character, business integrity, financial responsibility, etc."

Answering the second question, he says: "Where a licensing ordinance or statute requires the licensing of those engaged in a particular trade, it is not necessary that those already working in the trade be given a license without examination. On the other hand, a refusal to grant a license because the licensing authority thought there were sufficient contractors or journeymen, would not be sustained, in my opinion, nor would a refusal to license or extend a license because a contractor did not have a store with a stock of goods of certain value."

Two Recent Events Point to State Owned Power As Oregon Election Issue

STATE owned power will be before the people of Oregon as an election issue this year or next if we interpret accurately two events occurring in that state the latter part of January as repercussions of the public power hysteria in that state last year. One was the first meeting of the governor's "Super Power Committee of Oregon"; the other was the filing of a proposed constitutional amendment by the State Grange with the secretary of state.

Super Power Committee

The so-called super-power committee is composed of I. H. Van Winkle, attorney general, Charles E. Strickland, state engineer, and the three following members appointed by the governor: John H. Lewis, consulting engineer, Portland; J. W. McArthur, supervising engineer, Eugene Municipal Power System; and Hon. B. L. Eddy, Roseburg. Authority for this committee is found in Joint House Resolution No. 18 of the last legislature directing the committee to suggest legislation "providing for the cooperation of super power districts in Oregon, Washington and Idaho, whereby the public power plants in such states may be inter-connected by transmission lines . . . to the end that all economies may be made available to the public through interconnection over a wide area." At the first meeting, the committee chose the name quoted above and elected as its chairman, Mr. Lewis, who, as a representative in the last legislature, was the author, introducer and chief sponsor of the authorizing resolution.

Findings of fact by the committee were that (1) interconnection would secure economies due to diversity in peak load conditions of widely scattered communities; (2) it would secure economies due to diversity of stream flow conditions; (3) it would save duplication of steam stand-by power equipment; and (4) that "without ownership of such super-power systems the public cannot derive the above mentioned economies."

The committee having found that cities and power districts in both Oregon and Washington may legally interconnect within their respective states, will devise legislation providing for state ownership of power plants and transmission lines in Oregon to pave the way for a possible intra-state system, and will seek reciprocal legislation in Washington and Idaho.

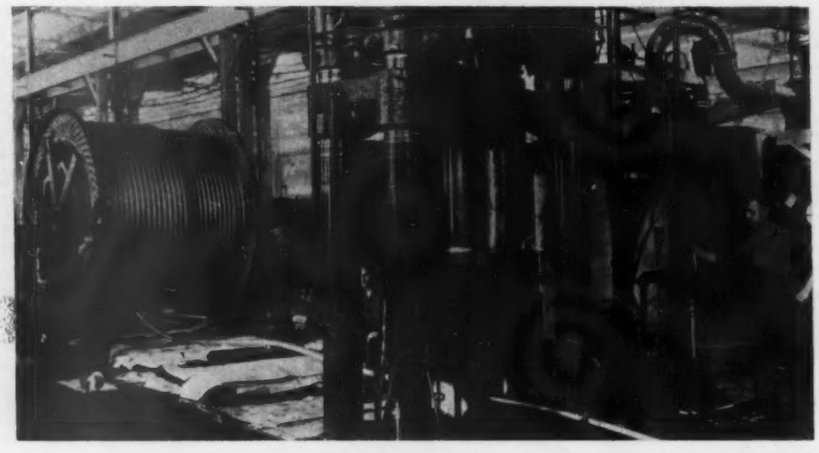
Mr. Lewis, who was formerly state engineer and is now a practicing consultant, has long been an advocate of public power development. He envisions a great publicly owned network in the Northwest consisting principally of large federally owned generating plants on the Columbia River, supplemented by smaller state owned plants on strategic streams, with the states, as purchasers of federal power, transmitting energy over their own lines and selling it at wholesale to municipalities, power districts, private power companies and large industrial users for distribution or use by such agencies. Mr. Lewis looks upon legal provision for state owned generation and transmission facilities as a prerequisite to congressional approval of federal development on the Columbia, which he claims will yield the cheapest power in the United States, and in turn influence a tremendous industrial development in the Northwest.

Grange Measure

The constitutional amendment proposed by the Grange would authorize the state of Oregon to develop water power within the state; to transmit, distribute and sell electric energy; to develop water power in conjunction with the United States or in conjunction with other states or political subdivisions thereof; to contract with the United States or other states for the purchase of water power and electric energy; to fix rates for the use of water power and electric energy; and to incur indebtedness to an amount not exceeding 6 per cent of the assessed valuation of all the property in the state to provide funds for these purposes. As soon as the attorney general provides a ballot title for this measure, the Grange proposes to circulate petitions to place the measure on the ballot by initiative at the next general election in November.

Consideration of this proposed amendment by the "super power committee" resulted in agreement to study the measure to see if it fulfills the legislative action needed to accomplish the objects sought in Joint House Resolution No. 18.

Submarine Cable for Columbia River



THE highest-voltage submarine cable crossing in the world, rated at 115,000 volts, is to be installed beneath the Columbia River and the Oregon Slough so that power can be transmitted directly to Portland from the new Ariel hydro-electric generating plant of the Northwestern Electric Co. on the Lewis River in Washington. The installation also will mark the first use of oil-filled cable for a submarine crossing. Here the cable is shown receiving its application of lead sheath in the Schenectady works of the General Electric Co.

The present route for sending power from Ariel to Portland is by overhead lines from Ariel to Vancouver, Wash., directly north of and on the other side of the Columbia River from Portland; then east several miles to Camas; across the river on overhead lines to Fairview; and then west to Portland.

While the cable will be rated 115,000 volts for a grounded neutral system, it will be operated temporarily at 66,000 volts on an isolated neutral system until power demands require an increase in the operating voltage.

The cable crossing will be from Vancouver to Hayden Island, and from there to the Portland shore of the Oregon Slough. Across Hayden Island there will be overhead transmission. Under the Columbia River there will be three 3,700-ft. lengths of the cable, buried beneath 6 ft. of the river bottom, and beneath the slough there will be three 1,515-ft. lengths, likewise buried.

M. S. Sloan Resigns as N. Y. Edison Co. President

The resignation of Matthew S. Sloan as president of the New York Edison Co. and The United Electric Light and Power Co., New York, and as president, trustee or director of the several companies of the Consolidated Gas Co. system, was announced last month. Mr. Sloan has stated his intention of engaging in other business. He is succeeded as president of the Edison company and The United Electric Light and Power Co. by Frank W. Smith. Mr. Smith has been vice-president and general manager of the Edison and United companies.

As president of the National Electric Light Assn. in 1930, Mr. Sloan took a prominent part in the convention of the association held in San Francisco in that year.

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San Francisco Appliance Ordinance Interpreted

Implications or interpretations not intended unfortunately were given the new ordinance recently passed in San Francisco in an announcement of it appearing in ELECTRICAL WEST (Feb. 1, 1932, p. 94).

Because of the confusion which resulted, Ralph Wiley, chief, Department of Electricity, San Francisco, who was flooded with inquiries regarding it, was asked to furnish this publication his official declaration regarding the ordinance so that it might be published and thus serve to clear up the misunderstanding.

In a letter to the editor Mr. Wiley definitely interprets the intent of the ordinance as relating to the regulating of appliances and equipment which may be connected to an ordinary house circuit, and to wire, sockets and such materials as are sold over the counter. He also sets forth clearly the extent to which his department itself will give provisional approval to such goods offered for sale under certain limited conditions, declaring that it is not the intent of the ordinance or department to set up a laboratory. The letter itself follows:

EDITOR ELECTRICAL WEST: . . . . . The ordinance was created for the purpose of regulating the sale of materials, devices or appliances which may be connected to an electrical circuit of 110 volts or over by means of an attachment plug, as well as to prevent the practice by dealers of removing the manufacturer's name plate and voltage current or wattage rating of the appliance.

It can be readily seen that the inspection bureau experiences no difficulty in preventing the use of materials, devices, appliances or apparatus which are directly or permanently connected to a circuit, as a certificate of approval would not be issued at the completion of the installation if sub-standard or non-listed materials or apparatus were connected thereto.

It is not the intent of the ordinance, nor the intention of the Department of Electricity, at any time to set up a laboratory or create a standard for the testing of the above-mentioned materials and devices. All materials and devices which are listed by the Underwriters' Laboratories automatically comply with the provisions of the ordinance and do not require approval by this department.

The following is a copy of Section 4 of the ordinance, which clearly and definitely covers the question of "provisional approval" by the chief of the Department of Electricity:

> Section 4. The chief of the Department of Electricity may grant "provisional approval" of electrical materials, devices or appliances under the following conditions:
>
> (a) Where no standard has been prepared or adopted to which they shall conform.
>
> (b) Where no other materials, devices or appliances of similar type are regularly listed or approved.
>
> (c) Temporary acceptance, in emergency, may be given to materials, devices and appliances not listed by Underwriters' Laboratories, Inc., provided such materials, devices or appliances have been submitted to the Laboratories for test and approval. Such temporary acceptance will ordinarily be granted for a period of 90 days only.
>
> "Provisional approval" (except where no standard has been prepared or adopted to which they should conform) applies only to the particular sample so "provisionally approved" and not to the line as manufactured, stored, sold, installed or attached, and shall be granted only for such materials, devices and appliances which, in the opinion of the chief of the Department of Electricity, are reasonably safe.

No manufacturer of repute who manufactures electrical materials, devices, appliances or apparatus need have any fear as to the effect this ordinance will have on the sale of his commodities in the City and County of San Francisco, but the sale of sub-standard non-listed appliances which create a fire or life hazard will not be permitted and the provisions of the ordinance is so far as this feature is concerned will be strictly enforced.

Very truly yours,
RALPH W. WILEY, (signed)
Feb. 17, 1932. Chief, Dept. of Electricity

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Los Angeles to Vote on Power Bonds in May

The Board of Water and Power Commissioners of Los Angeles has adopted a resolution of intention to ask voters at the city election to be held May 3 to approve a power bond issue of $34,400,000. The board's resolution instructs the city attorney to prepare the necessary resolution requesting the city council to submit the proposition to voters on the ballot.

The city power bureau's requirements for capital investment during the next four years were announced as $52,235,000 in a statement issued by Arthur Strasburger, president of the board. If the bureau's program is carried out, he said, $17,835,000 will be available from power revenues, leaving $34,400,000 to be provided by the proposed bonds.

The bond fund requirements are listed as: $17,500,000 for a transmission line from Hoover Dam; $11,240,000 for a steam plant at Wilmington, and necessary extension and betterments to the existing electric system, $5,660,000.

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PUGET SOUND POWER & LIGHT CO. will expend more than $25,000 in improvements and extensions in the Marysville district, including a $15,000 substation in Marysville which will raise the voltage from 4,000 to 12,000 out of Everett. The substation will include transformers and voltage regulators. The company also plans a line from Snohomish south to connect with the Cathcart system, to cost approximately $3,000.

House Committee Studying Electric Energy Tax

In considering new forms of taxation preparatory to drafting a new tax bill, the ways and means committee of the House of Representatives has had its attention directed to the possibility of levying a tax on the use of electric power. This suggestion has been made by Representative Crisp of Georgia who ranks next to the chairman on the Democratic side of the committee. It was originally proposed by Mr. Crisp that a tax of ½ c. a kilowatt-hour be assessed and that this should be a consumers' tax. Mr. Crisp later conceded that such a tax would be unreasonable and discriminatory, and the proposal was changed to one calling for a general sales tax of from 1 to 10 per cent applied to all electric, gas, and telephone bills.

A later development in the Congressional agitation for electric energy taxation was a suggestion sent Feb. 16 by Ogden L. Mills, newly appointed Secretary of the Treasury, to Representative Crisp proposing a 7 per cent tax on all *domestic* consumption of electricity and gas. A revenue of $94,000,000 is foreseen if the tax in this form passes the House.

Arguments against the proposed tax are being received in Washington by executives of gas and electric companies all over the country. According to A. F. Hockenbeamer, president of the Pacific Gas and Electric Co., San Francisco, the suggested 7 per cent tax will take $2,300,000 a year from the homes of northern and central California. Mr. Hockenbeamer points out that the sending of this amount yearly to Washington in taxes means taking that much out of trade and business in the territory served by his company. Chambers of commerce, merchants' associations and other organizations, he says, realize the danger and the burden and are passing resolutions against the tax and sending protests to Congressmen and Senators.

"The tax is clearly a tax on necessities," says Mr. Hockenbeamer. "Even in the war days of 1917 a tax on heat and light was too much for Congress. Provision was made in the first draft of the war tax bill to tax domestic electric service 5 per cent. The Senate finance committee struck out the tax, saying in its official report:

> 'This tax would fall with very great severity upon people of moderate means, as well as upon the poorest classes of the community, who at the present time depend very largely, if not entirely, in the cities, upon gas or electricity to furnish them with both light and heat for cooking, as well as in many cases with power for the running of small machinery like the sewing machine. The committee felt that a tax of this character ought not to be imposed unless a point was reached where it would become necessary to tax everything susceptible to taxation. *Light and heat are the very last things which should be made the subject of taxation.*'

"That was in war time and everybody was at work and far better able to pay taxes than today. Now we find thousands out of work or on reduced wages. Small householders were probably never less able to pay new taxes."

California Commission Attacks National Body

Charging that the National Assn. of Railroad and Utilities Commissioners as it is now conducted is "imperiling state regulation," the California Railroad Commission, together with the public utility commissions of New York and Wisconsin, has served formal notice upon the membership of the national association of its intention to secede from the national body unless the association "changes its course."

Announcement of the intention of the California commission thus to withdraw unless radical changes in policies are made appears in a communication addressed to state utility commissioners of the various states of the nation. Similar communications have been addressed to these commissioners by the public utility regulatory bodies of New York and Wisconsin.

The action of the withdrawing commissions is based on three grounds.

First: It is charged that at the annual meetings of the national association a number of utility officials and representatives have endeavored to "influence the action in the convention by furnishing entertainment to commissioners, and by other similar activities, and have seriously impaired the value of the conventions and are bringing the good name of the entire association into disrepute." The communication points out that a resolution intended to remedy this condition was defeated at the last convention. This resolution, so the communication of the California commission states, was intended "not only to exclude non-members from unduly taking up the time of the commissioners in discussions which would be more appropriately presented elsewhere, but was designed to discourage the attendance of the large number of utility officials and representatives who have regularly been invited to attend these yearly meetings."

Further objection is registered to the action of the association, which "voted to suppress and exclude from its public records the transcript of the debate on this issue."

Second: Formal opposition is voiced to the action of the association taken at its last convention in defeating a resolution providing that the yearly convention be held permanently, after 1932, at Washington, D. C. This resolution was offered by Clyde L. Seavey, president of the California commission.

In support of this resolution it was urged that Washington is a logical place to meet; that the association met there regularly for many years; that the main office of the association is there, as is also the Interstate Commerce Commission. It was pointed out that such a permanent meeting place would eliminate the present general criticism that the conventions had become more or less junketing trips; that the junketing aspects of the association conventions had injured public confidence in regulation; that because of the plain necessity for the most economical expenditure of public funds these junkets could not be defended and should be definitely terminated.

Third: Objection is taken to the action of the national association in continuing the "supervision" of the publications, *Public Utilities Fortnightly* and *Public Utility Reports*. This resolution, the California Railroad Commission states in its communication, was "especially intended to free the association of the quite natural innuendo attached to supervising and endorsing publications financed and controlled by public utility interests. The point was made that these publications and the work that they had done and were doing was a valuable one. But, it was said, that for the association to endorse and supervise a publication owned and operated by the very utility interests which the members of the association were required to regulate seemed obviously an improper situation and one which had been properly criticised in many quarters."

A resolution proposing the discontinuance of any connection with these publications was laid upon the table by the association without discussion.

The California Railroad Commission has addressed a summary of its attitude and that of the New York and Wisconsin commissions to each commissioner of every commission that is a member of the association, and has asked for a statement of the position of each member.

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Plan Offered City Light For Completion of Skagit

In an offer to the Seattle city council, Bayly Hipkins, construction engineer and contractor, proposes the completion of City Light's great 199,000-hp. Diablo power house, and the providing of employment for 250 Seattle men for the next fifteen months at $7 a day. The proposal, in writing, provides for taking $3,210,000 of City Light 6 per cent bonds at par and accrued interest in behalf of Mr. Hipkins and a syndicate of manufacturers and contractors.

Mr. Hipkins agrees to purchase for cash $1,374,000 worth of the bonds, with the understanding that the proceeds would be used by the city to pay off warrants and other obligations for labor, materials and equipment already furnished or yet to be furnished under existing contracts on the Diablo plant.

Mr. Hipkins also agrees to purchase $189,000 of bonds, the proceeds to be used for cashing warrants of that amount issued for the construction of the City Light Building at Third Ave. and Madison St. His offer is conditioned upon his being awarded a contract to furnish the labor, material and equipment necessary to complete construction of the Diablo plant. For this he agrees to accept $1,647,000 worth of bonds in lieu of cash.

The Hipkins proposal was received by the city council after City Comptroller Harry W. Carroll had failed to receive any bids on a $3 million issue of City Light bonds, under a call recently published. A Portland financial firm notified Mr. Carroll by wire that they might have an offer if given more time to complete their plans.

Being contingent upon letting of a new contract, the Hipkins proposal had to be referred by Comptroller Carroll to the city council, where it will be considered shortly. In the meantime, the board of public works will hold special sessions to investigate the terms of the proposal.

Although they withheld final opinion until the proposition has been consideder from every angle, Superintendent of Lighting J. D. Ross and city officials generally were pleased with the proposition.

"With the funds that would be provided" said Mr. Ross, "we can pay all existing contracts on the Diablo plant and complete its construction on schedule time."

In carrying forward the Diablo construction, Mr. Hipkins' contract would cover construction of the power house and tail race, a double transmission line from Diablo to Gorge, and installation of generators and waterwheels which have already been purchased by City Light.

Each of these projects Mr. Hipkins pledged himself in writing to complete strictly in accordance with the Light Department's plans and specifications. No contracts for any of this work have been let by City Light.

Contracts already completed at Diablo cover construction of the penstocks, power tunnel and foundations for the power house. It is for the purpose of providing funds to pay off the $1,374,000 still due on these contracts that Mr. Hipkins agrees to take bonds to that amount. The Diablo dam, long ago completed, has been paid for in full.

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Puget Sound Purchase By Puyallup Doubtful

Indicating that the city officials of Puyallup have been contemplating giving up the plan of purchasing and operating the property of the Puget Sound Power & Light Co., after having gone through the courts to condemn the system of the power company in Puyallup, Mayor S. R. Gray, of Puyallup, has made a proposition to J. F. McLaughlin, president of the Puget Sound company, that the company pay the city $25,000 in cash and consider the condemnation suit against the company's properties a closed matter.

The offer made by the city is the culmination of an effort on the part of Puyallup to sell bonds to cover the purchase price of the power company's property. Mr. Laughlin countered with an offer formerly made by the company to pay for the city's expenses in the condemnation suits with interest. This cost was approximately $16,000, Mayor Gray said.

Utility Accounting Study Made at Oregon Meeting

Continuation of the hearing before the Oregon Public Utilities Commissioner of the two-year-old complaint of the Merchants Utility Bureau of that state against merchandising accounting practices of electric and gas utility companies was heard in Salem on Feb. 16. (See ELECTRICAL WEST, Feb. 1, 1932, page 97.) In the second hearing complainants' case confined itself specifically to accounting practices, and introduced very little evidence pertaining to merchandising practices in the field.

An expert accountant for the petitioners introduced accounting analyses of the Oregon utility companies taken from their annual reports to the commission in recent years and of the 1931 merchandising accounts of the companies which had been prepared at the request of the commissioner. By these the witness attempted to show that merchandising losses were reflected in the rates of the companies in a manner unfavorable to the public. Petitioners also produced a suggested outline of accounting procedure for merchandising and jobbing departments of the utility companies and this outline was taken under advisement by the commissioner and by the companies with a view to determining what method of accounting is to be prescribed by the commissioner. In general terms this outline is described as providing for elaborate allocation of various charges to the merchandising department for all items of expense in any wise connected with the company's merchandising operation. Many companies in Oregon now carry their merchandising accounting very largely on an incremental basis.

No evidence was introduced by the companies tending to offset the implications made by petitioners' expert witness relative to alleged merchandise losses. Instead it was agreed by stipulation that the companies did not admit these implications but that in the interest of saving time and further hearings, they would forego the process of proving the fallacy involved in some of the testimony of the witness. The companies did, however, introduce some general evidence of the favorable effect past merchandising activities had had on lowering the average cost per kilowatt-hour to the consumer and on lowering rates. This was done through presenting in evidence the report of merchandising activities of Oregon utilities prepared last year. (ELECTRICAL WEST, May 15, 1931.)

V. H. Moon, sales manager, Pacific Power & Light Co., Portland, was the only witness for the companies and besides explaining the charts contained in the report, he was given an opportunity to testify to the merchandising policies his company had put into effect for the purpose of encouraging independent electrical dealers in his territory to secure as large as possible a volume of the appliance business.

Two conferences and the commissioner's final order on a new classification of accounts for merchandising operation are expected within a month.

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Hoover Dam Has 24-Hour Working Day

This unusual night view of Hoover Dam in the making was taken looking upstream along the Colorado River in Boulder Canyon past the four giant tunnels driven in the mountain side to divert water while the dam is building. Two of the tunnels have been holed through during the past month. Work goes on day and night.

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Denver Rates to Be Lowered in March

Electric rates in Denver will be lowered under a new rate schedule set up by Public Service Co. of Colorado. The revised structure, effective with March 15 meter readings, contemplates 6 c. per kw.-hr. for the first 40 kw.-hr. of domestic usage; 5 c. on all additional, as compared with the former 7-c. rate for the first 15 hours, 6 c. for the next 30 hours, and 5 c. for additional current. The new commercial lighting schedule is 5 c. for the first 1,000 kw.-hr. instead of the former 5½ c. Other classes will benefit proportionately.

The reduction was agreed upon by Clare N. Stannard, vice-president and general manager of Public Service Co., and the city council's public utilities commission, following a report of municipally-employed experts which recommended such a course. No cut in gas rates was suggested but the delayed-payment clause in customers' contracts was modified from 10 per cent to 5 per cent on both gas and electricity.

The decision came after several months' study by Herbert S. Sands and Herbert B. Dwight, engineers retained by the city administration, whose analysis placed a smaller valuation on Public Service Co.'s electric department than that claimed by the utility. On this basis, a cut in rates was recommended. Rather than submit the appraisal to court adjudication, the company acted favorably on the experts' report.

About 90,000 domestic, commercial and industrial customers will be affected by the change.

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P. G. and E. Reopens Hat Creek Power House

The Hat Creek power house No. 2 on the Pacific Gas and Electric Company's system in northern California is back in operation again after a year of inactivity as the result of an injunction granted L. P. Joerger, Shasta County rancher, who claimed that the water used in the operation of the Hat Creek plant was riparian to his land and that its diversion resulted in damage to that land.

On Jan. 26 the California Supreme Court refused to grant the power company a writ of *supersedeas* which the company had filed in an attempt to have the temporary injunction obtained by Mr. Joerger set aside. The court ruled that the action was unnecessary, as the filing of the appeal by the power company from the injunction, a step which the Pacific Gas and Electric Co. had taken following its granting, automatically stayed the injunction. Under this decision the power company put its Hat Creek plant No. 2 back on the line. Mr. Joerger has asked the supreme court for a rehearing of the proceedings in which it ruled that the company could reopen Hat Creek No. 2. It was shut down under the injunction on Feb. 6, 1931.

San Diego Gas, Electric And Steam Rates Cut

Interim rates established Feb. 16 by the California Railroad Commission to hold during the investigation into the rates of the San Diego Consolidated Gas and Electric Co., will save consumers under that system an estimated total of $600,000 a year.

Under the order establishing these rates, the company is given until March 1, 1932, to elect whether it will, on its own volition, bring natural gas into the territory that it serves. The effect of the order is to set up two sets of interim rates, one based on the use of manufactured gas, the other on the use of natural gas, with the company given the option to choose between the two.

The matter came before the Railroad Commission in an application made by the City of San Diego asking an investigation into the rates charged by the San Diego utility within the limits of San Diego. The Railroad Commission, on its own motion, broadened the investigation to embrace also the operations of the utility outside the city.

If the service of manufactured gas is continued as at present, the commission's decision holds present electric, gas and steam rates to be unduly high and orders percentage decreases to be made effective on meter readings of April 1, 1932, except upon minimum and demand charges. A discount of 10 per cent is ordered in electric schedules for general residence service, street and highway lighting, series municipal street lighting and general power service, a 17 per cent discount in charges for commercial lighting, and 12 per cent in agricultural power service charges. On the same date a 5 per cent discount will apply to charges for general gas service.

If the service of manufactured gas is replaced by natural gas, 5 per cent discount is ordered in charges for electric and highway lighting and series municipal street lighting, 1 per cent in general power service, and 7 per cent in agricultural power service rates. These reductions likewise do not apply to minimum and demand charges. The reduction in steam service charges is to be 11 per cent whether manufactured or natural gas service is supplied.

Minimum charges for natural gas in San Diego are fixed at 90 c. for the first 200 cu. ft., and outside at $1.15. The next 800 ft. is at 14½ c. per hundred; the next 2,000 12 c., next 7,000 10 c., and all over at 9 c. per hundred. All proposals for natural gas contemplate its purchase wholesale from one of the major southern California distributing companies, with delivery at La Jolla, at a rate not above 30 c. per 1,000 cu. ft.

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Steel Conduit Replaces Historic Wooden Flume

THIS old wooden flume, built to serve the pioneer hydro-electric plants of the Redlands (Calif.) Electric Light & Power Co., predecessor of the Southern California Edison Co., has just been replaced by a 30-in. electrically welded steel pipe carried on a steel substructure.

Sheep Cliff flume, the name by which the conduit has always been known, derives its name from the fact that one of the old Mormon sheep herders in this section found himself farther down the mountain slope than he anticipated, and in entire ignorance of this particular location, headed his sheep down into the canyon below. They arrived there much sooner than he expected, for Sheep Cliff is a precipitous wall, approximately 300 ft. in height! The flume is an example of what the pioneers of the industry had to contend with, in the face of adverse public opinion, and engineering reports that "it couldn't be done." There were no precedents to guide the promoters and no confidence on the part of the public that the transmission of electricity over long distances would be a success; therefore, the cheapest, simplest and most direct methods were used.

Sheep Cliff flume was a part of the original conduit conveying water from the headworks of Mill Creek hydro-electric plant No. 2 to the power house. The new steel line is 476 ft. long.

Price Set for Sale of Edison Property to City

Values of the distribution system of the Southern California Edison Co. in certain portions of Los Angeles which the city plans to acquire were established early last month by the California Railroad Commission.

The values set by the commission are only slightly above those of the city, but are strikingly below prices asked by the Edison company for the properties. The discrepancy is accounted for by the higher valuation for going concern and potentialities accorded the systems by the power company.

A price of $1,390,000 is fixed by the commission as the compensation that the city is to pay for properties, in cluding severance charges, in the Hamilton, Santa Monica Canyon, Venice, Green Meadows, Buckley, Watts, Sunland, Martel and Beverly Glen additions to Los Angeles. The city's valuation figure for these properties was $1,385,000; that of the Edison company ran from approximately $4,800,000 to $6,200,000, both including severance charges.

Value of the property of the power company in Tuna Canyon, Mar Vista and Barnes City additions is fixed by the commission at $379,000; the city's valuation was $351,700. Estimates of the company on this property varies from approximately $600,000 to $900,000, all figures including severance charges.

Hearings in the case were conducted by Clyde L. Seavey, president of the Railroad Commission, who wrote the decision. Two petitions for a rehearing have been filed by the power company. Constitutionality of the Public Utilities Act, so far as it relates to condemnation proceedings, is attacked in both petitions.

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IDAHO KW.-HR. TAX CASE TO U. S. SUPREME COURT—The Utah Power & Light Co., Salt Lake City, has appealed to the U. S. Supreme Court for a decision in the now famous Idaho kilowatt-hour tax case. Constitutionality of the law passed by the Idaho Legislature last year imposing a tax of ½ mill per kw.-hr. on all electrical energy generated within the state was upheld in a decision handed down Dec. 31 last in the Federal Court for the District of Idaho.

Validity of Aqueduct Bond Issue Upheld

Judgment in favor of the Metropolitan Water District of Southern California was rendered by the Los Angeles county superior court Feb. 8, in an action brought by a taxpayer seeking to invalidate the $220,000,000 bond issue voted by the district for construction of an aqueduct from the Colorado River.

The taxpayer, Mrs. Katherine K. Buck, sought to invalidate the bonds on the grounds that the voters had been misled by pre-election statements. She contended that the amount voted would be insufficient to construct the aqueduct, that the water would not be fit to drink and that voters had been deceived by promises of immediate employment for several thousand men.

Declaring that "he who pleads fraud must prove fraud," and that no fraud or illegality had been proved by the plaintiff, Superior Judge Leon R. Yankwich, who rendered the decision, pointed out that almost any bond issue could be set aside if no stronger evidence of fraud were required than had been presented in this case.

This is the second case in which the superior court has upheld the validity of the bond issue. In the first action, a Long Beach taxpayer attacked the issue on the grounds that the Metropolitan Water District act was unconstitutional. This first decision has been appealed to the state supreme court.

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Officers Named for Engineers' Relief Body

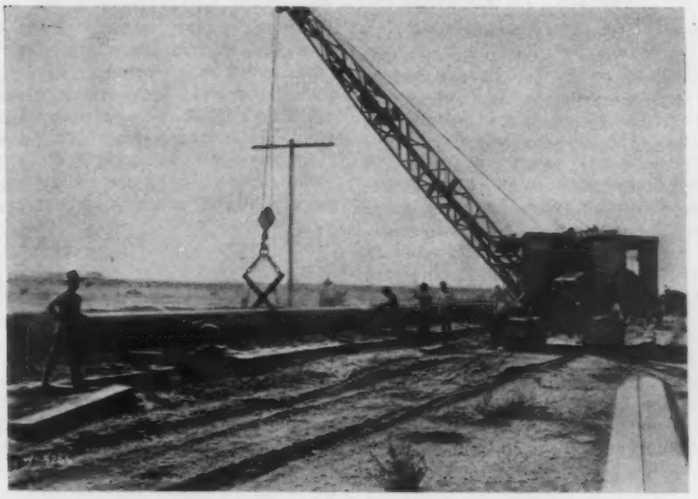
P. R. Hines, mining engineer, Portland, has been elected president for the coming year of the Oregon Technical Council consisting of representatives of all major branches of engineering in the state. Other officers are: vice-president, G. F. McDougal, mechanical engineer; directors, E. C. Willard, civil engineer, C. H. Wallwork, architect.

Chief function of the council this year will be to direct the engineers' relief organization recently formed to give financial relief to unemployed engineers in distress and jobs to those who can be placed.

O. L. LeFever, superintendent, Northwestern Electric Co., retiring president of the council, will continue as active head of the executive committee of this organization until the plan is in operation, and G. B. Herington, consulting engineer, will act as secretary. At present the survey of conditions respecting unemployment among engineers and a solicitation for funds in the different groups is going forward.

Committee organization to carry on operation of the plan consists of: finance—E. B. MacNaughton, vice-president, First National Bank, and former practicing civil engineer; O. B. Coldwell, vice-president, Portland General Electric Co., and A. S. Moody, manager, Northwest office, General Electric Co.; eligibility—G. F. McDougal, consulting mechanical engineer; A. T. Williams, consulting civil engineer; and C. H. Lundell, city electrical engineer; employment—F. D. Weber, Oregon Insurance Rating Bureau; S. M. Lister, Civic Building Service Bureau; Fred Cook, McCracken-Ripley Company; E. F. Pearson, Northwestern Electric Co.; and C. C. Hockley, consulting civil engineer.

Kettleman Gas Pipe Sets Speed Record



Lining up and tacking crews working on the 26-in. electrically welded transmission line of the Southern Fuel Co. between Kettleman Hills and Los Angeles. Using 40-ft. lengths of pipe, the crew made welds at the rate of 22 each per nine hour day, using Lincoln Electric Co shielded arcs. Southern Fuel Co. was organized early in 1931 by Pacific Lighting Corp. and the Southern California Edison Co. The Long Beach steam station of the Edison company is now supplied with gas from Kettleman Hills. New speed records for pipe line construction were established with the laying of this 210-mi. line

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Lassen County (Calif.) Towns Ask Lower Rates

A group of consumers in Lassen County using electric power furnished by Lassen Electric Co. have filed a complaint with the California Railroad Commission asking that an investigation be conducted into the rates charged by that company and the rules and regulations it enforces. The complaint charges that the present rates and rules are excessive and discriminatory, and asks that new rates and regulations be imposed upon the company. The complaint is signed by consumers resident in Susanville, Standish, Litchfield and Johnstonville.

Residents of neighboring towns in Lassen County, also served by the Lassen Electric Co., organized the Lassen Municipal Utility District a few months ago. It was announced at the time of the district's formation that a request would be made of the Railroad Commission to have rates lowered, and failing this, the district would take steps to acquire the power company's system and operate it as a municipal plant.

Ample Water for Energy Supply in West Colorado

Eastern Colorado faces a dry spring and summer, but the western watershed has enjoyed heavy snowfall which forecasts ample water for hydro-electric generating and irrigation purposes. This information is contained in a report by M. C. Hinterlider, state engineer, on snow and moisture conditions throughout the state.

Both Arkansas and South Platte River basins are reported subnormal as to moisture, according to the survey. In areas fed by these streams, only reservoirs with older water rights will be able to fill, and storage at present is far below average. March and April snows, such as prevailed in 1931, may relieve the situation.

The heaviest snows of the winter have fallen in southwestern Colorado. Snow at high altitudes is from 4 to 10 ft. deep, which is 50 per cent above normal. Storage is also 50 per cent above normal in this district, which suffered severe drought last year.

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SOUTHERN SIERRAS RATES REDUCED—Revision in two electric schedules of The Southern Sierras Power Co. has been approved by the California Railroad Commission. The first covers general power service and the second municipal pumping service effective in the Imperial County district. Revision of the first schedule will effect a reduction of $58,500 in power bills, and the second a reduction of $3,560.

Taxes Take 10 Per Cent Of P. G. and E. Revenue

With one of the largest checks ever received by the Treasury Department of the State of California, the Pacific Gas and Electric Co. has just paid $3,136,313.68 covering the second half of its state taxes for the fiscal year ended June 30, 1931, a total of $6,272,627.36. This amount represents 7½ per cent of the company's gross receipts for the period. The power company is the second largest taxpayer in California, the Southern Pacific Co. being the first.

In addition to state taxes, the Pacific Gas and Electric Co. has paid the federal taxes for 1931 of $1,678,672.31, various city and county taxes, $442,516.54, gasoline tax, $62,386, and miscellaneous taxes which bring the total taxes paid by the power company to $8,459,415.98. This amount represents more than 10 per cent of the company's gross revenue for the year, and its payment means that all the proceeds of the Pacific Gas and Electric Co.'s operations for one day out of every ten or for nearly six weeks out of the year are expended exclusively for taxes, according to Charles G. Johnson, state treasurer of California.

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Alameda Now Supplying Government Island Energy

Overcoming War Department objections to the project, the Alameda (Calif.) municipal department of electricity cut in the electric distribution system on Government Island in the Oakland-Alameda estuary last month, and the City of Alameda will hereafter sell energy to the federal base on the island. The Pacific Gas and Electric Co., which formerly served the island, has agreed to relinquish its rights to the sale of energy to the city. The present load of approximately 400 kw. will be largely increased with the completion of the government base on the island, it is believed.

To overcome the War Department's objection, the city agreed to transmit current over established conduits; the laying of a permanent cable will await the proposed dredging of the estuary, according to R. Ray Fritz, manager of the Alameda municipal department.

Negotiations are now under way looking toward the acquisition by the City of Alameda of the business of supplying the Posey tube across the estuary with electric current, Mr. Fritz said.

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POWER PLANT WILL HELP TO FINANCE IRRIGATION PROJECT—A power plant, estimated capacity 30,000 hp., to be built a mile and a half from the Yakima River at Union Gap, Wash., is expected to help finance construction of the proposed Yakima-Benton irrigation project. According to plans revealed in Yakima last month by W. E. Rowe, reclamation engineer, the outstanding feature of the project will be a large power ditch, 101 mi. in length, which will half-circle Yakima and the Roza irrigation canal. The power ditch, which will carry 3,000 sec. ft. of water, will take water from the Yakima River and follow the course of the ditch and canal of the Moxee Canal Co. East Selah and Moxee Valley acreage coming under the canal will be about 4,000 acres; beyond the valley approximately 66,000 acres will be irrigated.

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City Gives Consumers One Month's Electricity Free

The problem of successful and profitable operation of a municipal electric power plant seems to have been solved by the City of Fort Morgan, Colo., if the gift of free electricity for one month to customers who were not delinquent on bills is any indication. Upon the vote of the city council the municipal plant was authorized to serve electricity during January free to customers who were not delinquent on bills, the limitation of usage to be 15 per cent in excess of December consumption. The electric power plant supplied 3,737,120 kw.-hr. in 1931 to 1,500 meters.

Fort Morgan is said to have $142,000 in its sinking fund to retire bonds against a water plant and electric power plant, which are not due until 1937. The fact that one man, George Cox, has had charge of the Fort Morgan utilities—for Mr. Cox is also superintendent of the municipal water plant—for 26 years, instead of their having been allowed to become political footballs, as is so often the case, would appear to have an important bearing on the results obtained.

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Rates Reduced in Longview, Wash.

The second reduction in electric rates during the past year went into effect Feb. 1 in Longview, Wash., when the Washington Gas & Electric Co. reduced residential lighting rates in that city. A former reduction, which also included some downward revision of the combination cooking and lighting rate, was given consumers May 1, 1931.

The company's new rate basis is as follows: Ten cents per 100 sq. ft. of "active" floor area is charged plus 4 c. per kilowatt-hour per 100 sq. ft. for the first 10 kw.-hr.; 3 c. for the next 20 kw.-hr; and 2 c. per kw.-hr. for all over 30 kw.-hr. Each house is given its particular rating as to floor area. Previously the charge was 4½ c. for the first 100 kw.-hr., and 3 c. per kw.-hr. above 100, per 100 sq. ft. of area.

Clarence E. Lasher, local manager, gives an example of the saving possible under the new rates, as follows: The average five-room house using 40 kw.-hr. of electricity per month paid $2.30 a month under the old rate; on the new schedule, the cost will be $2.10, a saving of $2.40 per year. The very small household using 20 kw.-hr. a month and paying $1.40 under the old rate will now pay $1.20.

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District Takes Steps to Equalize Power Supply

Turlock (Calif.) Irrigation District and the San Joaquin Light & Power Corp., Fresno, Calif., have applied to the State Railroad Commission for approval of an agreement providing for the sale by the district to the power company of surplus electric power manufactured at the Don Pedro and La Grange power plants. The agreement further provides that if stored water in the district's Don Pedro reservoir shall be depleted during the period from June 1 to Dec. 31 of any year, thereby rendering Turlock unable to generate electric energy necessary for its own purposes, the San Joaquin corporation shall sell and deliver to the district at Livingston or Merced Falls substation such electric energy as it may require up to 5,000 kw.

In a separate application, approval of the commission is asked of the purchase by the Turlock Irrigation District from the Sierra and San Francisco Power Co. and Pacific Gas and Electric Co. of the Hickman substation, a portion of the Don Pedro-Modesto transmission line, all electric transmission lines of the Sierra and San Francisco Power Co. operated at less than 20,000 volts, and certain described telephone lines and equipment. As consideration for this property Turlock agrees to pay the Sierra and San Francisco company $170,000, either in cash or electric energy. The P. G. and E. Co. is joined in the application as lessee of the property of the Sierra and San Francisco Power Co.

P. C. E. A.

P.C.E.A. to Compete in National Speaking Contest

Under the direction of the Public Relations Section, P.C.E.A., member companies of the National Electric Light Assn. in this territory will again participate in the national employees' speaking contest. Except for slight changes, the plan of the contest is similar to those conducted in 1930 and 1931.

Parallel contests for men and women will be carried on as in the past. The contestants will have the choice of two subjects: "The Relations of Government and Business" and "The Electrical Industry as an Economic and Social Factor in America." Some elasticity has been given the contestants by a new rule which states that the length

of the talk should not be more than 15 minutes nor less than 5 minutes.

The first elimination contests among member companies will be conducted on April 8; the southern California, northern California and Arizona contests on April 22; the P.C.E.A. quarter-finals on May 6, and the regional semi-finals on May 27, from which the winners will go to Atlantic City for the national finals.

In the P.C.E.A. quarter-finals the following prizes will be awarded to both men and women:

First prize	$100
Second prize	75
Third prize	50

In Atlantic City the final prizes awarded to both men and women, will be:

First prize	$600
Second prize	500
Third prize	400

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Pasadena Chosen for 1932 Convention

The Huntington Hotel, at Pasadena, Calif., has been selected as the scene of the 1932 Pacific Coast Electrical Assn. convention. The meeting will be held from Tuesday to Friday, June 14-17. The Huntington offers a most desirable setting for the event, and the 1928 convention held there drew the largest attendance in convention history.

Daniel L. Scott, Los Angeles Gas & Electric Corp., general convention chairman, announces the organization of the following convention committees:

Registration—William C. F. West, Los Angeles Gas and Electric Corp., chairman.

Publicity—Eugene P. Ramsay, Los Angeles Gas and Electric Corp., chairman.

Transportation—F. H. Ducker, Southern California Edison Co., chairman.

Lighting and Decorations—Scott Betts, Westinghouse Electric & Mfg. Co., chairman.

Entertainment—Richard E. Smith, Southern California Edison Company, chairman; C. H. Thrane, General Electric Supply Corp., vice-chairman.

Auditing—Oscar L. Moore, Los Angeles Gas and Electric Corp.

Hotel — Ralph Hopkins, Westinghouse Electric & Mfg. Co.

Sports—E. R. Northmore, Los Angeles Gas and Electric Corp.

Special Events—S. E. Gates, General Electric Co.

Program Manager—Wm. Maddock, Los Angeles Gas and Electric Corp.

Attendance Manager—E. F. Watkins, Southern California Edison Co. Ltd.

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"Government Ownership" Is Essay Contest Topic

"An essay from every English-speaking employee" is the slogan of the Commercial Section of the P.C.E.A. for the essay-writing contest this year. The subject is "Government Ownership," and the contest period is from March 1-April 4. The subject was selected because of its timeliness and the valuable text available in the N.E.L.A. employee information committee's pamphlet No. 3 on "Government Ownership." This pamphlet contains a variety of material, including concrete examples to point the arguments, excerpts from articles, letters and speeches from those qualified to express themselves, and an informative series of questions and answers.

A handsome trophy has been presented to the Commercial Section by Addison B. Day, president of the P.C.E.A., to be awarded to the company having the highest percentage of employee participation in the contest. This is to be a perpetual cup, and was given because of President Day's enthusiastic belief that the annual essay-writing contest is productive of much good both to the industry and to the employees.

All power company employees below the rank of executive and major department head (managers, superintendents, etc.) are eligible to compete in the contest. While the N.E.L.A. manual is recommended as a guide to the writing of essays, the use of any material available on the subject of Government Ownership" is encouraged. In order to receive a copy of the manual each contestant must signify his intention of competing in the contest by signing a registration card.

Trophy offered by Addison B. Day for best company participation in P.C.E.A. essay contest

Essays are limited in length to not less than 400 nor more than 1000 words. They will be judged 60 per cent on knowledge of the subject and 40 per cent on originality and clearness of expression. Prizes offered are as follows: First prize, $100; second prize, $75; third prize, $50; fourth prize, $25; next ten prizes, $15 each; next twenty prizes, $10 each. After the prize-winning papers are withdrawn, prizes of $5 each will be awarded to 50 of the remaining essayists by a drawing.

Contest directors in the respective companies in the association have been appointed as follows: J. S. Arnold, Central Arizona Light & Power Co.; G. T. Bigelow, The Southern Sierras Power Co.; A. D. Church, San Joaquin Light and Power Corp.; S. E. Davis, Elko Lamoille Power Co.; A. C. Joy, Pacific Gas and Electric Co.; Miss Ella Russell, Coast Counties Gas and Electric Co.; A Shackelford, Tuscon Gas, Electric Light & Power Co.; R. E. Smith, Southern California Edison Co. Ltd.; C. F. Stanley, Los Angeles Gas and Electric Corp.

Northwest Association

Utility-Dealer Relations Is Theme of Meeting

A desire to improve dealer relations and to develop the market for electric utilization devices through all possible channels was the theme around which many committee reports and addresses at the seventh annual mid-winter conference of the Commercial Section, Northwest Electric Light & Power Assn., were woven. The meeting was held at the Multnomah Hotel, Portland, February 18-20. Attendance was nearly double that at last year's meeting, there being a greater percentage of manufacturers' representatives, distributors and dealers present.

In his opening remarks, P. M. Parry, Utah Power & Light Co., Salt Lake City, president of the association, outlined the responsibility of commercial men of the utilities to the consumer and to those who have provided the capital for utility business, and sounded the key-note of the meeting when he dwelt at length on the utilities' responsibility to manufacturers and dealers. This subject received a more complete consideration in the three committee reports of the Merchandising Bureau heard along with other related subjects during both sessions of one full day.

On this day, George C. Tenney, editor of ELECTRIAL WEST, San Francisco, portrayed the magnitude of the domestic market; a report on load building in Oklahoma without merchandising by A. A. Brown, Oklahoma Gas & Electric Co., was read; an accounting study of the value of a kilowatt of connected load was presented by H. O. Hussong, The California Oregon Power Co.; and Dean H. S. Rogers of the School of Engineering, Oregon State College, discussed utilization research. On the same day George M. Gadsby, Utah Power & Light Co., regional director of the Refrigeration Bureau, outlined the 1932 plan of the national campaign, and R. Gill, Frigidaire Corp., Portland, told of his company's latest achievement in the development of air conditioning equipment.

Two other half-day sessions, one devoted to the Power Bureau and a re-

port of the customers' relations committee, and the other to the Lighting Bureau and the rural electric service committee, completed the program. Details of committee reports and talks at the meeting will be more fully covered in the next issue of ELECTRICAL WEST.

A. I. E. E.

A.I.E.E. CONVENTION IN AUGUST—Tentative arrangements are now being drawn up for the Pacific Coast convention of the American Institute of Electrical Engineers, to be held in Vancouver, B.C., Aug. 29-Sept. 2. Arrangements for the convention were discussed at a recent meeting of the Vancouver branch of the Institute.

ENGINEERS' UNEMPLOYMENT RELIEF—To provide an emergency service to its unemployed members, the San Francisco Section of the American Institute of Electrical Engineers recently formed an unemployment relief committee, under the chairmanship of F. R. George. Through the agency of this committee, gainfully employed members may render limited financial assistance to unemployed members of the Section who may be in urgent need of relief.

Meetings

Coming Events

American Institute of Electrical Engineers—Annual Pacific Coast convention, Vancouver, B. C., Aug. 29-Sept. 2, 1932.

Illuminating Engineering Society—Twenty-sixth annual convention at New Ocean House, Swampscott, Mass., week of Sept. 26, 1932.

International Association of Electrical Inspectors, Northwest Section—Seventh annual convention at Wenatchee, Wash., Sept. 6-8, 1932 (tentative).

Southwest Section—Convention at Santa Barbara, Calif., Sept. 12-14, 1932.

National Electric Light Association—Annual convention and exhibit, Atlantic City, N. J., June 6-10, 1932.

Northwest Electric Light & Power Assn.

Engineering Section meeting, Portland, April 13-15, 1932.

Accounting Section meeting, Spokane, April 18-19, 1932.

Pacific Coast Electrical Assn.—

Commercial Section meeting, Santa Cruz, Calif., March 17-18, 1932.

Engineering Section meeting, Fresno, Calif., March 9-11,1932.

Purchasing and Stores Section meeting, Fresno, Calif., March 9-11, 1932.

Annual convention at Huntington Hotel, Pasadena, Calif., June 14-17 1932.

Jobbers Learn How California Companies Will Spend 1932 Budgets

TWO open meetings, instead of the usual one, provided a full and interesting program for delegates to the meeting of the Pacific Division, National Electrical Wholesalers' Association, at Del Monte, Calif., Feb. 4-6.

Featured speaker at the first of the open meetings, held Friday, Feb. 5, was George W. Davis, of Davis, Skaggs & Co., San Francisco bond house. Mr. Davis gave an analysis of "Present Economic Conditions."

Reviewing the construction and sales programs of electric utilities operating in the state of California, W. L. Frost, vice-president of the Southern California Edison Co. Ltd. in charge of sales, and R. E. Fisher, who holds a corresponding position with the Pacific Gas and Electric Co., showed how the money appropriated by these utilities for 1932 construction would be spent. Mr. Frost and Mr. Fisher appeared on the program of the second open meeting, held Saturday morning.

Companies whose construction budgets were included in this analysis are the Los Angeles Gas and Electric Corp., Pacific Gas and Electric Co., San Diego Consolidated Gas & Electric Co., San Joaquin Light & Power Corp., Southern California Edison Co. Ltd., The Southern Sierras Power Co. and the Vallejo Electric Light & Power Co.

The total figure budgeted for construction by these companies in 1932 was given as $38,916,014. This was itemized as follows:

Labor	$12,563,040
Poles	1,291,500
Hardware	670,300
Insulators	809,500
Transformers	3,160,900
Copper	2,905,000
Cement	660,600
Lumber	431,500
Auto mileage (estimated cost)	1,526,910
Gasoline	303,450
Generators	2,000,000
Steel (towers and racks)	858,500
Miscellaneous (additions to steam plants, substations, meter testing, etc.	11,734,814
Total	$38,916,014

COMMERCIAL PROGRAM

The combined commercial program of the California companies was shown to have set the following goal for the year's accomplishment:

New Business in Horsepower:

Lighting	151,908 hp.
Power and industrial heating	242,269 hp.
Cooking, air and water heating and appliances	176,240 hp.
Total	570,417 hp.

Residential Load:

Number of new residences to be connected	31,785
Number of Red Seal homes	1,770

Merchandising Plans (Quotas):

Electric ranges	10,487
Electric water heaters	4,075
Electric air heaters (hp.)	18,218
Electric washers	25,820
Electric ironers	4,615
Electric cleaners	16,415
Electric appliances (misc.)	256,642
Lamps (total purchase price for commercial and residential use)	$330,810
Heavy-duty cooking and heating appliances (hp.)	11,560

To achieve this result, 356 salesmen will be employed by the companies, and $247,700 will be spent for advertising.

Another feature of Saturday's program was an address by Harry L. Harper, Los Angeles manager of the Graybar Electric Co., entitled "The Ideal Electric Home," a report of which appears elsewhere in this issue of ELECTRICAL WEST.

P. H. Gough, of Listenwalter & Gough, Los Angeles, was elected chairman of the Pacific Division for the year and immediately distinguished himself by carrying off the Copper Cup in the association's golf tournament, played on the Del Monte links. George Boring, General Electric Supply Corp., Portland, won the Oakes Trophy. Ray Murphy, of the Westinghouse Lamp Co., San Francisco, played a hole in one on the fourteenth and won the Manufacturers' Cup. The Central Station Cup was not played for at the meeting, but was made a complimentary award to Donald Tolles, manager of the national association.

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NO ARIZONA UTILITIES CONVENTION—At a recent meeting of the executive committee of the Arizona Utilities Assn. it was decided not to hold the annual convention of the association, which was scheduled to have been held in Tucson, Ariz., April 13-15. Present economic conditions are given as the reason for the committee's decision. In place of the annual convention it is the plan of the executive committee to meet at regular intervals during the coming year to discuss problems of the industry. If conditions permit, the holding of an annual convention will be resumed in 1933.

EVERETT, WASH., TO HAVE ELECTRIC CLUB—Electrical men of Everett, Wash., announce the formation of an electric club, patterned after the Electric Club of Seattle, which will consolidate the interests of men of the industry, including central station operatives, electrical jobbers, contractor-dealers, engineers and manufacturers' representatives. H. S. Atwood, manager of the sales department, Puget Sound Power & Light Co., Everett, and A. H. Rink, manager of the Standard Electric Co., Everett, are prime movers in the organization of the club.

ELECTRICAL LEAGUE OF EL PASO officers were recently announced for 1932 as follows: president, M. B. Amstater, Zork Hardware Co.; vice-president, B. M. Davis, General Electric Co.; secretary-treasurer, L. J. Last, El Paso Electric Co. Five standing committees were elected by the members, including program, membership, code, auditing and advertising-publicity committees.

Personals

Montana Power Company Promotes F. W. Bird

FRANK W. BIRD, for the past twenty years affiliated with the Montana Power Co. with headquarters in Butte, Mont., has been appointed assistant general manager for that company and its subsidiary companies. The appointment became effective Jan. 1.

In announcing Mr. Bird's promotion, Frank M. Kerr, general manager for the power company, said: "Frank W. Bird has been connected with the Montana Power Co. for more than twenty years; during this long period he has been charged with the performance of many important duties. For the past decade or more he has been called on to discharge many of the duties of the office to which he has now been formally appointed. His promotion is a deserved recognition of his abilities as an engineer and as an executive."

Mr. Bird, who is a civil engineer by profession, has been a resident of Montana since 1903.

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J. R. GEARY, representative of the General Electric Co. at Tokyo for the past 27 years, has recently retired. In San Francisco en route last month to the East where he will make his home, Mr. Geary said that Nippon's electric light and power business now amounts to more than 1,100,000 kw. of generating machinery. Of this 600,000 is hydro and 500,000 steam generation. "The coal oil lamp," he said, "is going on the scrap heap in Japan." This is due to the widespread use of electric lights in rural as well as urban districts. Mr Geary addressed the San Francisco Electrical Development League on Feb. 29 on "Japan in Manchuria."

W. J. WEAVER, general sales manager of The Bryant Electric Co., Bridgeport, Conn., made a tour of the Pacific Coast in February to review business conditions in this territory, and in particular to confer with H. E. Sanderson, of San Francisco, Bryant's Pacific Coast manager.

C. J. REID, of Los Angeles, Western divison manager of the Automatic Washer Co., Newton, Iowa, and Jack Slattery, of Newton, factory representative of the company, were San Francisco visitors in February.

DONALD TOLLES, manager, National Electrical Wholesalers' Assn., New York, attended the Del Monte (Calif.) convention of the association's Pacific Division early in February.

HENRY WHITE, vice-president and sales manager of Fretz Moon Conduit Co., Cleveland, Ohio, was a Pacific Coast visitor in February.

L. M. KLAUBER

M. B. FOWLER

A. E. HOLLOWAY

Six San Diego Company Executives Promoted

WILLIAM F. RABER, president of the San Diego Consolidated Gas & Electric Co., recently announced the election of L. M. Klauber, former general superintendent, to the position of vice-president in charge of operation. The promotion is in appreciation of 21 years of service with the company.

Mr. Klauber joined the San Diego utility in 1911 as a salesman in the commercial department, shortly after completing the Westinghouse graduate apprentice course. Later in the same year he was placed in charge of the company's record department. Subsequent promotions made him successively superintendent of the electric department, assistant general superintendent and general superintendent. In 1923 Mr. Klauber became vice-president and general superintendent, a position which he has since held until his present advancement.

Five other promotions were also announced by President Raber.

M. B. Fowler, who for the past 27 years has occupied the position of secretary-treasurer, was elected to the office of vice-president and treasurer. He has been associated with the gas and electric company for 28 years. Mr. Fowler was elected to the board of directors and made treasurer of the company in 1907; in 1921 he was appointed to the executive committee.

A. E. Holloway is now vice-president in charge of sales. Formerly, he was superintendent of the commercial department and has been with the utililty company since 1910. Mr. Holloway is a past president of the San Diego Chamber of Commerce and the San Diego Electric Club. He is a director of the Pacific Coast Electrical Assn. and the Pacific Coast Gas Assn.,

J. A. Cannon, who has seen 23 years of service with the San Diego public service company, has been elected to the office of secretary and general auditor.

H. R. Peckham, assistant general superintendent for the past 10 years, has now been appointed general superintendent.

E. D. Sherwin is now assistant general superintendent, a promotion from his former position as assistant to the general superintendent.

EDGAR KOBAK, vice-president and general sales manager of the McGraw-Hill Publishing Co., Inc., New York, made a personal survey of business conditions in California in February, spending a week at the San Francisco office of the McGraw-Hill Co. of California, of which he is president. Mr. Kobak addressed the San Francisco Electrical Development League Feb. 10 on "The Stuffed Shirt." The day of this type of executive, who allowed his organization to ride along on its own momentum in prosperous times, devoting his main attention to the stock market and other outside interests, is passing, Mr. Kobak said. Through lack of close contact with its problems and its personnel, the "stuffed shirt," he said, has lost the power of leading his organization out of the difficulties that beset it today. The new leaders in business, said Mr. Kobak, will be the men who knuckle down now to hard work and devote all their energies to the job in hand. While on the coast Mr. Kobak also addressed the San Francisco Advertising Club and the eighth annual conference of the Iron, Steel and Allied Industries of the California State Chamber of Commerce, held at Santa Barbara, Feb. 11-13.

R. W. SHOEMAKER, formerly electrical engineer and superintendent of the electrical department of the Turlock (Calif.) Irrigation District, a position which he gave up to go to Rio de Janiero to take up work with Electric Bond & Share interests, has returned to San Francisco after two years' stay in Brazil. He plans to resume the practice of his profession.

C. J. BRITTAIN, vice-president of Canadian Fairbanks-Morse, Ltd., recently arrived in Vancouver from his headquarters at Westmount, Quebec, on a business trip. The visit to Vancouver was a part of a tour of all the branches of his company throughout Canada.

W. P. GEARY, rate expert of the California Railroad Commission, has been promoted to the position of examiner for the commission. Warren K Brown, Mr. Geary's assistant, has succeeded his as rate expert.

EDWARD F. SIXTUS, vice-president and sales manager, Pacific Electric Mfg. Corp., left San Francisco last month for a business trip in the East.

ALBERT G. CAGE

LEWIS E. BROWN

A. G. Cage Advanced by Southern Sierras Co.

ALBERT G. CAGE, since 1919 assistant general agent for The Southern Sierras Power Co., Riverside, Calif., has been placed in charge of its new rate department.

Mr. Cage entered the employ of the power company in 1914 as clerk in the engineering department and during the same year was transferred to the commercial department. Following his service in the World War he returned to the Southern Sierras company in 1919 and was made assistant general agent. In 1921 he took a furlough to accept a position with the California Railroad Commission, returning to the commercial department as assistant general agent during the following year, a position he has held until his present advancement.

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Westinghouse Manager Heads Utah League

LEWIS E. BROWN, manager of the Salt Lake City office of the Westinghouse Electric & Manufacturing Co., who has been elected president of the Electrical League of Utah for the year 1932, has been associated with the Westinghouse company since first entering its apprenticeship course at East Pittsburgh in 1901. In 1905 he was placed in the position of construction engineer with that company on the Ontario Hydro-Electric Power Commission project, where he remained until 1907. During that year he was transferred to the Cincinnati district as construction engineer for the Westinghouse company. In 1909 he was engaged in a similar capacity in Denver. Three years later he was transferred to Salt Lake City where he entered the sales department of the company, and in May, 1913, he was appointed to the position which he now occupies in the Salt Lake City office.

Mr. Brown is closely identified with the business life of Salt Lake City, and is well known and popular as one of the prominent members of the electrical fraternity in that section.

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HARRY C. SMITH, of Idaho, has been named assistant chief engineer by the Federal Power Commission.

A. H. BARTSCH, of the General Motors Corp., Detroit, was a recent visitor to the Northwest. Mr. Bartsch is devoting a great deal of his attention to General Motors' subsidiary, Frigidaire. After spending some time in Spokane, Seattle and Portland, he returned East by way of Denver.

C. H. CARTER, former manager of the merchandising department of the Mine & Smelter Supply Co., Denver, has been made manager of the company's electrical department.

Obituary

Ernest C. Headrick Dies in Denver

ERNEST C. HEADRICK, owner of the Headrick Electric Co. and for more than a decade secretary of the Electrical League of Colorado, died suddenly at his home in Denver Feb. 8.

E. C. HEADRICK

Mr. Headrick's connection with the electrical industry dates back to 1888 when he moved from his birthplace, Johnstown, Pa., to Pittsburgh, where he entered the private laboratory of George Westinghouse. In 1900 he went to France as representative of the Westinghouse Electric & Mfg. Co. Upon his return he became assistant shop superintendent of the power apparatus department of the Western Electric Co. in Chicago.

Establishing himself in Denver in 1909, Mr. Headrick became a prominent figure in the local electrical contracting business. From 1919-1922 he served as president of the Denver Assn. of Electrical Contractors and Dealers, and for many years represented the Mountain District on the executive committee of the Association of Electragists-International. He was a charter member of the Electrical League of Colorado, serving three times as president, in 1910, 1920 and 1921. Since then he has been secretary.

Mr. Headrick was active in business until the heart seizure that ended his career. He was 63 years old and is survived by his son, Paul E. Headrick, who is associated with the firm that bears the family name.

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FREDERICK L. HUTCHINSON, national secretary and executive manager of the American Institute of Electrical Engineers, New York, died in that city on Feb. 26. Mr. Hutchinson had been with the A.I.E.E. since 1904. He was a Cornell graduate in electrical engineering, and was associated with the Westinghouse Electric & Mfg. Co. for a number of years following his graduation, later serving as manager of the publication department of the C. W. Hunt Co., New York. Immediately before joining the A.I.E.E. organization, Mr. Hutchinson had for two years been manager of the electric sales department of the National Electric Co., Milwaukee.

ARTHUR E. CALDWELL, since 1923 in charge of the telephone service for the entire system of the Pacific Gas and Electric Co., with headquarters in San Francisco, died at his home in San Jose, Calif., on Jan. 26 from a heart attack. Mr. Caldwell joined the Pacific Gas and Electric Co.'s organization as a salesman in 1911 and later became superintendent of new business for the San Jose division, a position he held until he was put in charge of the company's communication system.

BERNARD GOODWIN GOWARD, solicitor for the Vancouver Island branch of the British Columbia Electric Railway Co., Ltd., died at his home, Cadboro Bay, Victoria, B. C., recently. Mr. Goward was a brother of A. T. Goward, Vancouver Island vice-president of the B. C. Electric.

WILLIAM H. BULLOCK, formerly associated with the Westinghouse Electric & Manufacturing Co., Denver, and more recently a consultant in the office of H. S. Sands, consulting electrical engineer there, died in that city Jan. 22, at the age of 49.

CLARENCE FOLSOM, chief electrical inspector of the city of Antioch, Calif., died suddenly at his home there on Jan. 27 last.

JOSEPH L. KLINE, president, Western Light & Fixture Co., Los Angeles, died at his home there on Feb. 19.

Contractor Dealer Inspector

Stockton Dealers Form New League

Another revival of the Electrical League idea was made in the organization of the San Joaquin County Electrical Development League at Stockton, Calif., in January. A second meeting was held on Feb. 8, jointly with the Radio Trades Assn., and a third meeting is scheduled for March 3.

Ray Bass, manager, Commercial Electric Co., was elected president, and George W. Graffis, Pacific Gas and Electric Co., was named secretary. Ward C. Shafer, P. G. and E. division sales manager, was named chairman of the program committee. Membership is being recruited not only from Stockton but from Lodi, Manteca, Tracy and surrounding country. As with other similar leagues, all branches of the industry are included.

At the organization meeting, brought together under the direction of Frank Kiefer, northern regional manager, Pacific Coast Electrical Bureau, the speakers were Earl Browne, Meyers Safety Switch Co., San Francisco, and Edward Martin, Sterling Electric Co., San Francisco, president California Electragists, and Don Ray, manager public relations, P. G. and E.

A second meeting with the Radio Trades Assn., extending members of the latter an invitation to participate, brought responses from the association's president urging radio dealers to join.

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NEWBERY ELECTRIC CORP., whose office and store at 726 South Olive St., Los Angeles, has been the headquarters from which many of that city's largest electrical installations have been general staffed, has moved to a new two-story building of its own at 1038 Venice Blvd. where the company formerly operated a warehouse and yard. Glenn Arbogast, president of the company, has been president of the California Electragists and is now president of the Southern California Electrical Contractors and Dealers Assn. Roy Spilsbury, vice-president and general superintendent of construction, and D. D. McFarlane, secretary treasurer, are active in industry activities.

T. C. HAWKINS, of the electrical firm of Hawkins & Hayward, Victoria, B. C., was recently elected director of the Victoria and Island Publicity Bureau. Both the partners of this electrical contracting and retailing firm take a prominent part in public affairs on Vancouver Island. Mr. Hayward was recently elected reeve of Oak Bay.

Everett Contractors Want Inspector

The city council of Everett, Wash., has been requested by the electrical contractors and journeymen electricians to appoint a city electrical inspector. The post has been combined since the first of 1932 with the offices of building and plumbing inspectors, under supervision of James Ballew. The electrical men point to safety and fire hazards which may result from neglect of electrical inspection.

The council, at its next legislative session, will consider an ordinance to abolish the office of electrical inspector and combine the posts of building and plumbing inspector under the office of superintendent of buildings. It is the plan to have the latter hire an electrician to make inspections wherever necessary. It is pointed out that under present conditions little building is being done, with consequently small need for electrical inspection.

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THE CAMP ELECTRIC CO., whose headquarters for several years have been 804 West 3rd St., Los Angeles, has moved into larger premises at 732 West 3rd St., in that city.

SACRAMENTO'S ELECTRICAL CONTRACTORS AND DEALERS ASSN. plans to have a series of four educational meetings to instruct contractors, dealers and their salesmen in the uses and selling of electricity for cooking and heating, according to an announcement recently given to the press by W. H. Welsh, secretary. Speakers are to be drawn from the manufacturers, wholesalers and similar organizations, the meetings to be held on Monday evenings for a four-week period. A supper begins the meeting in each case. The purpose of the meetings is better to prepare the dealers to sell electrical merchandise aggressively.

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Joe

J. C. Hobrecht, one of California's ever active, creative merchandisers, whose store has developed with trends because Mr. Hobrecht is a keen analyst of public fancy and daring in anticipating and adjusting his business to meet conditions

Tacoman

Bob Gleason, Tacoma contractor-dealer, whose downtown store is an electrical headquarters and whose window displays are always attractive

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Electragists Revive Boat Ride

Despite any implications to the contrary, says Edward Martin, president, California Electragists, the date of the all-star revival of the annual boat ride from San Francisco to Sacramento is no April Fool stunt. April 1 happens to fall particularly appropriately on Friday, and April is just the right time for a spring convention, and anyone who has ever been on one knows that the river steamer to Sacramento makes an ideal excursion vehicle preparatory to a convention.

Therefore, on April 1, at 6 p.m. the electrical industry is invited by the California Electragists to throw cares overboard, step onto the reserved entire lower deck of the Delta Queen, and pass the night sailing up the Sacramento River, with variations, arrive in Sacramento in the morning, repair to the convention hotel, and there participate in the session.

The morning session will be an open meeting for the industry, at which the Pacific Coast Electrical Bureau will make a presentation of the year's program. Speakers on other subjects are also to be scheduled. The afternoon session will give the Electragists themselves an opportunity to discuss intimately many of the current business problems of contracting.

Golf will be arranged for those who desire it during the afternoon while the contractors go into their huddle.

Return to San Francisco will be made by the same steamer, leaving Saturday night, Apr. 2, and arriving in San Francisco Sunday morning. A special rate of $10 has been arranged

for this year, which amount will include travel, berth and meals. Entertainment features will be provided and it is expected that the customary "good time will be had by all" of former years when this trip was a feature event will be relived.

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Denver Wiremen Deny Wage Reduction

In spite of general downward revisions of building trades wage scales in various parts of the country, negotiations of two committees in Denver during the past six months to bring about voluntary reductions in the wages of electrical workers resulted in a deadlock. The Denver Electrical Contractors Assn., which is a party to an agreement with local union No. 68 of the I.B.E.W., requested a 12½ per cent reduction in wages for electrical workers on the basis that such a move would stimulate rewiring and building activity generally.

In a letter from C. B. Noxon, business agent for the union, the latter turns down the request. The union holds that the wage should remain in effect during the period of the present agreement, which does not expire until Oct. 15. Unless each contractor who became a party to the agreement separately files 30-day notice with the Industrial Commission of Colorado to abrogate the agreement, the reduction of wages will prevent him from employing union men.

The committee working on this matter for the contractors was W. A. J. Guscott, E. R. Stettler and D. D. Sturgeon.

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Past President Pinch Hits

Clyde L. Chamblin, past president of the Association of Electragists-International and of the California Electragists, was the speaker at a joint meeting of the Santa Clara County Electrical Development League and the dealers of the Santa Cruz, Watsonville, Salinas and Palo Alto regions, held at San Jose, Feb. 4. As northern regional director of the Pacific Coast Electrical Bureau, Mr. Chamblin, proprietor of California Electrical Construction Co., San Francisco, spoke of industry activities which are destined to make markets for all branches of the industry.

Other speakers were Don Ray, manager public relations, Pacific Gas and Electric Co., Harry Thomas and Arthur Rowe. Jack Ross, sales manager, P. G. and E. Co., San Jose, was chairman of the day, with Roy M. Butcher, president, presiding. Mr. Chamblin substituted for Al Joy, publicity manager, P. G. and E.

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SIERRA MADRE ELECTRIC CO., formerly situated for several years at 19 Kersting Court, in that city, is now occupying new quarters at 26 W. Central St., Sierra Madre. J. C. Rogers owns and operates the business.

In Old Arizona

Surrounded by J. P. Deppe, of Phoenix, (left) and C. H. Thrane, of Los Angeles (right), Glenn Arbogast, president of the Southern California Electrical Contractors' Assn., seems to hold his own on any course

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DENVER'S NEW ORPHEUM THEATER, recently completed, was the electrical work of art of the Reliable Electric Co., Denver, and was supervised during installation by Max Price. ELECTRICAL WEST will soon publish an article on the features of this installation.

HEADQUARTERS OF THE ELECTRICAL CONTRACTORS AND DEALERS ASSN. of Southern California, and of the Los Angeles association, for many years located in the Cotton Exchange Bldg., Los Angeles, have been removed to 1323 Venice Blvd., in the building owned by H. H. Walker, electrical contractor, it was announced by Frank J. Connolly, executive secretary, last month.

Vancouver Contractors Reorganize

The Vancouver Electrical Contractors' Assn. has been formed in Vancouver, B. C., for the purpose of improving conditions among residential wiremen of that city. In connection with the organization a schedule of suggested minimum charges has been drawn up, the use of which has been found of considerable value in improving cut-rate competition which previously existed to a considerable extent in the residential wiring trade.

A. Cowsill, of the Imperial Electric Co., 1061 Barclay St., Vancouver, is president of the association, with T. Smither, 2821 West 42nd Ave., Vancouver, as vice-president, and R. Hall, 323-425 Carrall St., acting secretary. R. Niven, W. Rowley, J. H. Worrall, N. Nemetz, and S. Fine comprise the advisory council. Weekly executive meetings are held, with regular association meetings scheduled for the second and fourth Wednesdays of each month.

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B. K. SWEENEY ELECTRIC CO., Denver, has discontinued handling wiring supplies, but will continue to sell lamps, refrigerators, washing machines and other domestic appliances.

HUNTINGTON RADIO & ELECTRIC CO., 32 East Huntington Drive, Arcadia, Calif., is the new name of the business formerly known as Harper's Electric & Radio Co., C. Norton having purchased the business from W. W. Harper.

STURGEON ELECTRIC CO., Denver, recently was awarded the contract for the American Theater, in Denver.

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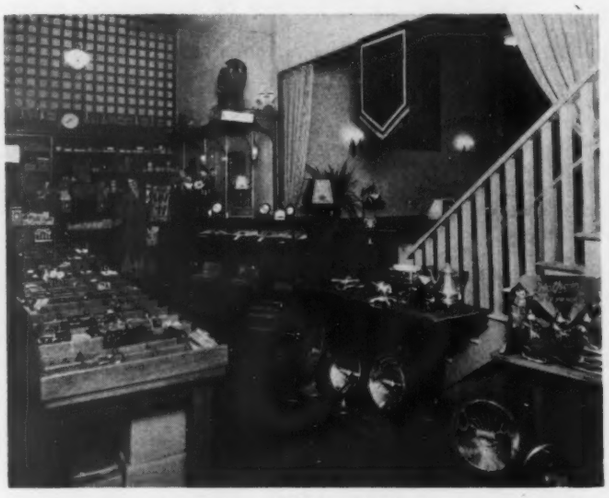
Thrives on Competition



A. L. Stone, of Los Angeles' Stone Electric Supply Co. likes competition "because it helps build up my business." When a cut-rate chain established an electrical department in its store around the corner, this Electragist increased his volume because he showed customers better merchandise and gave them real technical service, such as can be duplicated only by a legitimate dealer. He has other views on selling, too, such as combining both contracting and merchandising jobs by wiring a home and then equipping it with necessary appliances. "It's easier that way, because you already have sold the customer on your ability and she readily will accept the merchandise you recommend," says he

Manufacturer Distributor

Ernest Ingold, Inc., and Coast Radio Supply Merge

On Jan. 1, the lines and organizations of Ernest Ingold, Inc., and the Coast Radio Supply Co., both of San Francisco, were consolidated under the name of the latter with headquarters at 123 Tenth St., in that city. H. E. Lapkin is president of the newly consolidated company, which will handle distribution in northern California and Nevada of Sparton radios and the new Sparton refrigerator, Atwater Kent radios, the Black & Decker Cinderella washer and dishwasher and the line of Star-Rite appliances manufactured by the Fitzgerald Mfg. Co., of Torrington, Conn. The Atwater Kent and Black & Decker lines were formerly distributed by Ernest Ingold; Sparton and Fitzgerald were Coast Radio accounts.

Ernest Ingold, Inc., has opened new offices at 1182 Market St., San Francisco, and will deal in first trust deeds. Ernest Ingold, president, is a past president of the San Francisco Electrical Development League.

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Diamond Electric to Build Denver Factory

Diamond Electric Manufacturing Co., of Los Angeles, which recently took over the Mosher Manufacturing Co., of Denver, plans to establish a factory in that city soon. D. G. Kendall of San Francisco is to be local plant manager, and will supervise the new plant's operations.

Selection of a site for the building will be made this spring, according to Vernon Brown, president, who was in Denver recently. This factory, for manufacture of electric power switches and panel boards, will be the farthest East of Diamond Electric's divisions. It will be manufacturing and distribution center for Colorado, Wyoming, eastern Montana, Nevada, Utah and northern New Mexico.

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PACIFIC ELECTRIC MFG. CORP., of San Francisco, recently moved its Los Angeles offices from the H. W. Hellman Bldg. to the new Edison Bldg. at 601 West 5th St.

K. K. GORDON, Westinghouse refrigeration service manager, has been transferred from Los Angeles to the San Francisco headquarters of the Westinghouse Electric & Mfg. Co.

COLLINS KELVINATOR CORP., Los Angeles distributor of Kelvinator electric refrigerators, has moved its headquarters from 1414 West Seventh St. to 1058 South Hope St. in that city.

Pacific Wholesale Makes Leigh Borden President

Appointment of Leigh Borden as president and general manager of Pacific Wholesale, Ltd., Southern California distributor of Sparks-Withington Co.'s Sparton products, was announced recently in Los Angeles. At the same time announcement was made that Sparks-Withington would enter the refrigeration field with a complete line of cooling units.

LEIGH BORDEN

Harry G. Sparks, vice-president of the Sparks-Withington Co., Jackson, Mich., formally presented the entire line of Sparton radio and refrigeration products in Los Angeles Feb 9 at luncheon at the Commercial Club. In a presenting the line, to which a new short wave radio receiver recently was added, Mr. Sparks extended greetings of his company to Pacific Coast dealers and outlined plans for an intensive sales campaign.

Mr. Borden, who succeeds Walter M. Fagan as head of the wholesale distributing company, has been a member of the Pacific Wholesale, Ltd., organization for eight years and during the past five years has been Pacific Coast manager. Mr. Fagan resigned, it was announced, to devote his time to other interests.

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New Company Formed to Distribute Refrigerators

A new combination of individuals well-known in the southern California field of electrical refrigeration and radio has been formed under the name of Kirkpatrick, Foote & Auerbach to handle distribution in southern California and Arizona of Buckeye refrigerators, manufactured by Domestic Industries, Inc., Mansfield, Ohio. Headquarters of the new concern have been opened at 1350 East Sixth St., Los Angeles.

Members of the firm are W. L. Kirkpatrick, Claude E. Foote and J. Auerbach. Mr. Kirkpatrick formerly was general manager of the refrigerator department of the Platt Music Co., Los Angeles, and prior to that was Pacific Coast manager for Copeland refrigerators. Mr. Foote formerly was Southern California manager of the H. R. Curtiss Co., in charge of distribution for Philco radios in the Southern California territory. Mr. Auerbach formerly was engaged in the retail radio business, with the Harbor Music Co., San Pedro, Calif.

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NEON SIGN MEN FORM DENVER ASSOCIATION—An association of neon sign manufacturers has been formed within the Manufacturers' Division of the Electrical League of Colorado, Denver. E. W. Stephenson, of the General Outdoor Advertising Co., is chairman of the association. R. S. Cabell of the Electrical Products Co., is vice-chairman, and George Bakewell, Jr., executive manager of the league, is secretary. The neon association is considering the launching of a cooperative advertising campaign to stimulate interest in the use of neon.

HARVEY C. POND, general sales manager of the Arrow-Hart & Hegeman Electric Co., Hartford, Conn., was a San Francisco visitor in February. Mr. Pond spent some time at the offices in that city of Garnett Young & Co., which recently took over distribution of the entire line of Hart & Hegeman products. Formerly this company had handled only the Hart & Hegeman wiring supplies. Now Hart & Hegeman receptacles have been taken over by the Young company, which recently gave up distribution of the Harvey Hubbell line of similar products.

HARVEY HUBBELL REPRESENTATIVES—Frank A. Strohecker, Seattle, has been named Pacific Northwest representative of the line of wiring materials made by Harvey Hubbell, Inc., Bridgeport, Conn. Mr. Strohecker will cover Washington and Oregon and will maintain Seattle headquarters in the Ayers Bldg. Paul A. Douden & Co., of Denver, has been appointed Rocky Mountain representative of the Hubbell line.

GILLAN SALES CO., 74 New Montgomery St., San Francisco, has been appointed Pacific Coast representative of the Majestic washer made by Richmond Cedar Works, Richmond, Va. This washer, recently introduced, sells in the medium price field. S. P. Parrish, with offices at 1406 Merchandise Mart, Chicago, is western sales manager of the Richmond Cedar Works.

CHANSLOR & LYON STORES, INC., with headquarters in San Francisco, has been appointed exclusive distributor of the Leonard electric refrigerator, made by Leonard Refrigerator Co., Detroit. N. J. Etienne is manager of the refrigerator department of Chanslor & Lyon.

CORNING GLASS WORKS, Corning, N. Y., has appointed the J. E. Redmond Co., of Phoenix, as its representative for the sale of Pyrex power insulators in Arizona, New Mexico and that part of Texas in the vicinity of El Paso.

"G. E. Corner" in San Francisco—One of The West's Finest Appliance Stores

WITH a completely remodeled and modernized building, The L. H. Bennett Co., Ltd., northern California distributor of General Electric refrigerators, now has at the corner of Sutter and Stockton Sts., San Francisco, one of the most attractive display rooms in northern California and a refrigerator and appliance store that is among the finest in the West. The building, formerly occupied by the Kreiss Furniture Co., was opened for business by the Bennett company the latter part of January. The location will be known as the "G.E. Corner" and is ideally situated as a retail outlet at a downtown intersection immediately adjacent to San Francisco's exclusive shopping district. Maximum window display is obtained by the corner location and by effective use of well lighted mezzanine windows. The interior of the store is spacious, permitting effective display arrangements and lighting facilities.

In addition to a line of General Electric refrigerators, The L. H. Bennett Co. has taken over the distributorship in northern California for General Electric Hotpoint ranges and water heaters, and added to its San Francisco display is a complete line of G. E. home appliances.

Mr. Bennett's success with General Electric products, culminating in the opening of this new store, has been outstanding. Since starting in business in Oakland in 1927 with a small store and a few men, he has built his sales organization, in less than five years, to one of the largest exclusive selling organizations in California, operating ten retail stores in San Francisco, Oakland, Berkeley, Sacramento, Stockton, San Jose, Palo Alto and Burlingame, with the remainder of California covered by over 100 dealers. In this short time over 25,000 General Electric refrigerators have been sold. Taking over the distributorship of Hotpoint ranges and water heaters will increase his dealer organization approximately 75 per cent.

Although the sales activities of the Bennett company, which have heretofore been exclusively confined to electrical refrigeration, now include merchandising of other appliances, the company's policy of sales specialization will not be abandoned; the organization has been so departmentalized that the various sales will function practically as independent units. Retail salesmen, of which there are over 100, will be encouraged to originate and interchange prospects for appliances handled by other departments of the business, thereby increasing their earnings by earning part commissions on such sales. The new policy of the Bennett company of combining other electrical appliance lines with electric refrigeration will be watched with interest by electrical dealers who are confronted with the problem of overcoming seasonal slumps in sales.

San Francisco store of The L. H. Bennett Co., Ltd., in the heart of the city's shopping district

G. E. ranges, refrigerators and other appliances are displayed by the Bennett company in one of the most attractive show rooms ever offered them

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Frigidaire Changes Coast Sales Organization

Changes in the Pacific Coast sales organization of the Frigidaire Corp., Dayton, Ohio, became effective last month with the appointment of J. L. Conover, former Pacific Coast manager, to the post of manager of the east central region, with headquarters at Dayton.

Mr. Conover has been succeeded in the West by R. G. Hutchinson, who has been made Pacific Coast regional manager. C. C. Lee, formerly of Minneapolis has been placed in charge of the Oakland-San Francisco district, H. L. Harbison the Portland-Seattle district, and H. C. Jamerson the Los Angeles district.

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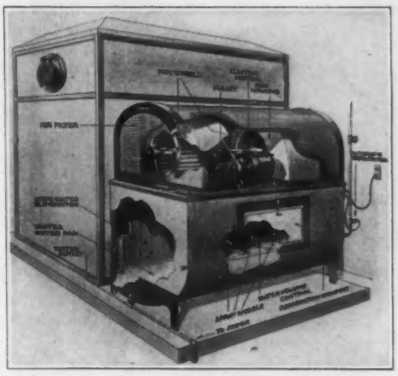
J. M. FELDMAN CO., licensed sun-lamp fixture manufacturer of San Francisco and Los Angeles, has joined in the cooperative advertising campaign featuring equipment for the use of the Type S-1 and S-2 sunlight lamps. The Feldman company is the first Pacific Coast manufacturer to participate in the campaign, inaugurated last fall. Its sunlight equipment has been approved by Mazda laboratories.

THE MAY-BIRD CO., 1315 Howard St., San Francisco, has been appointed distributor of the Gilfillan electric refrigerator and Gilfillan radio in northern California. The company is a sales agency recently organized by Otto May and Robert Bird, formerly president and sales manager, respectively, of the California Victor Distributing Co.

F. A. CANNON has been appointed Pacific Coast manager of the Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y., and will make his headquarters at the San Francisco offices of Garnett Young & Co., Stromberg-Carlson's Western representative. Stocks of the manufacturer's products will be carried at all Garnett Young warehouses up and down the coast, from which all shipments will be made in this territory.

HOTPOINT RANGE MONTHLY—"The G. E. Calrod" is now being published monthly by the Edison General Electric Appliance Co., Inc., Chicago, for the range salesmen of distributors, dealers and utility companies handling Hotpoint ranges. In attractive magazine form, the publication gives the news of Hotpoint range activities throughout the United States.

New Products



Air-conditioning Unit

A new air-conditioning unit recently introduced by the Holland Furnace Co., of Holland, Mich., for attachment primarily to warm-air heaters, is equipped with a ¼-hp. motor for operating a high-speed, twin fan that keeps the home air constantly circulating through the air-conditioning unit. The fans draw the air through a copper mesh filter and then force it through a series of water sprays. This filtering and washing process removes approximately 99 per cent of the dust and dirt from the home air.

The water sprays impinge against a unit termed an eliminator through which the washed air passes, the washing water dripping off into the sewer, carrying with it dust and other impurities from the air. The washing process is the primary means for cooling the home air during the hot weather period, and supplies sufficient humidity during the winter season to offset the customary dryness of indoor air. The unit receives its water supply by direct connection with the house main. ELECTRICAL WEST, March 1, 1932.

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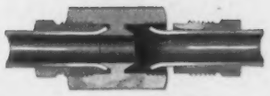
Outdoor Switch Houses

Metal-clad outdoor switch houses for medium capacity distribution circuits are announced by the Delta-Star Electric Co., Chicago. They are equipped with T.P.S.T. solenoid operated, trip-free oil breakers, rated at 7.5 kv., 400 amp., interrupting capacity 30,000 kva. The circuit breakers are controlled from the switchboard substations.

Space above the operating mechanism provides for instruments, relays, reclosing timer, control switch, etc., converting the units to full-automatic and self-contained if required. Front and rear doors give ready access to all parts for inspection.

Manual, d.c. solenoid, a.c. and d.c. trip-free motor mechanisms are available. The houses are compact, well constructed, low in first cost and maintenance.—ELECTRICAL WEST, March 1, 1932.



Relay Pressure Valve

A development of the Bailey Meter Co., Cleveland, Ohio, is a relay pressure valve known as the Style G, designed to give accurate pressure control of steam, water or gas lines. The valve controls the pressure within close limits by regulating the movement of a syphon- or piston-operated throttle valve installed in the line in which the pressure is to be controlled. A minute change in the controlled pressure results in a relatively large change in the motive pressure used to operate the regulating valve.—ELECTRICAL WEST, March 1, 1932.

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Time Delay Switch

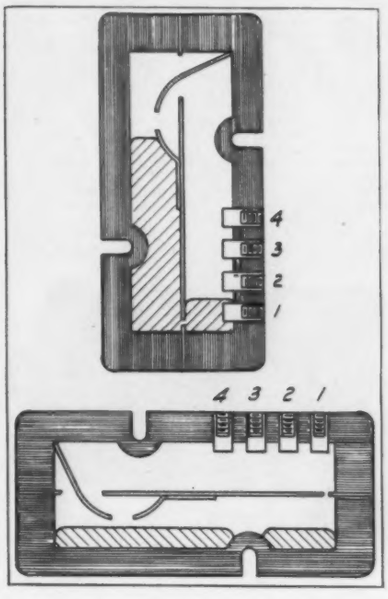
A new time delay switch, unaffected by temperature changes or operating conditions, has been developed in the laboratories of the Lincoln Electric Co., Cleveland, Ohio.

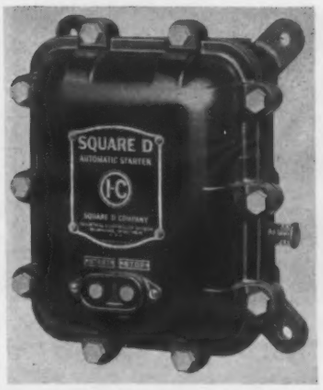
The operation of this switch may, in a way, be likened to the well known hour glass, since its principle is the slow movement of mercury from one chamber to another. The lower sketch shows the switch in the off position with the mercury in the lower chamber. Wire connections are tapped to the upper compartment of the switch. In the upper view the switch has been turned and the mercury has begun to flow into the other cavity through a small opening. As this mercury rises it completes the circuit at the various taps. By changing one connection to the different taps, a variation in time delay is secured in each switch, as it takes longer for the mercury to rise to the higher tap.

When the switch is turned off—that is, when it resumes its horizontal position—the mercury passes through a large opening into the lower chamber and the switch is ready to be used again as contact is broken immediately.

This device is mounted in connection with the contactor switch so that when this main switch goes in the delay switch is changed immediately to a vertical position, and vice versa when the main switch is thrown off.

This type of switch can be built for an accurate time delay of 2 to 20 seconds. Totally enclosed, it is not affected by temperature variations, dust or other harmful atmospheric effects. It can be used in a number of applications; at present it is built into the Lincoln automatic induction controller.—ELECTRICAL WEST, March 1, 1932.





Explosion-proof Starters

Class 8,532, types AR-1 and BR-1 explosion proof starters manufactured by the Industrial Controller Division of the Square D Co., Milwaukee, have been approved by the Underwriters' Laboratories for use in Class 1, Group D locations, which includes such hazardous atmospheres as are encountered in oil refineries, dry cleaning, paint, varnish and lacquer plants.

Type AR-1 has a "start-stop" push button in the cover, whereas type BR-1 is designed for remote control. The starter mechanism consists of a ruggedly constructed three-pole magnetic contactor and thermal overload relays mounted on a porcelain base. An explosion-proof cast-iron enclosure surrounds the starter mechanism.

The starters provide low voltage protection and release, also time-limit overload protection to a.c. single and polyphase across-the-line motors. Maximum ratings are 1½ hp. 110 volt, 3 hp. 220 volt single-phase; 5 hp. 220 volt, 7½ hp. 440-550 volt polyphase.—ELECTRICAL WEST, March 1, 1932.

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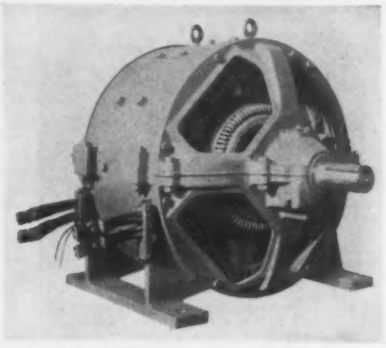

Larger D. C. Motors

Larger motors for its type T d.c. line have been announced by the Reliance Electric & Engineering Co., 1088 Ivanhoe Road, Cleveland, Ohio. The new motors range in size from 100 hp. at 800 r.p.m. to 350 hp. at 1,200 r.p.m.

A rolled-steel split-frame construction is used. The feet and supporting members are of heavy bar steel securely welded to the frame. There are six main poles and six commutating poles. For the field coils metal bobbins are used. Brackets and sleeve bearings are of split design. Two oil rings at the front end of the motor and three at the back keep the bearings well lubricated.

The brushholders combine the advantages of the reaction-type with those of the box-type. The brushes are always kept at proper tension. Brush studs are made of steel, cadmium plated. Heavy fibre insulation is used for the studs. Hard-drawn copper bars are used for the commutator.

The leads are brought through both ends of the frame and held in place by wooden cleats. No terminal board is used, so that the connections can be completely taped and need not be exposed. The motors may be supplied for constant-speed or adjustable-speed service with a range of 2 to 1 or 3 to 1.—ELECTRICAL WEST, March 1, 1932.

Light-socket Reflector

A two-way lighting unit for interior illumination that may be screwed into any ceiling-suspended light-socket has been developed by the Wuelker Reflector Lighting Corp., 231 Franklin St., San Francisco.

Known as the Wuelkerlite, the fixture is composed of an aluminum reflector, inverted, and finished inside with Wuelker patented "diffusion," the lower part of the reflector being cut away and Wuelker "Beauart" opal glass (diffused) placed in such a manner that from one bulb brilliant illumination is obtained both above and below. The light throws upward a clear daylight white brilliance reflected downward with great intensity, and from below the rays are softened and diffused by the glass.

The unit is primarily designed for use with one 150-watt lamp, but gives greater efficiency by the use of a 200-watt lamp. Improved suspension wires used are easily detachable from the body of the reflector for cleaning or bulb replacement. Finished in cream enamel or any desired color, the unit comes complete with socket extension and glass. It is suitable for kitchens, bathrooms, bedrooms, dining and living rooms —in fact anywhere in the home, and it may be removed as easily as a lamp when moving. Intended retail price, $3.45.—ELECTRICAL WEST, March 1, 1932.

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Modern Standard Range

A new range in the modern manner is being offered this month by The Standard Electric Stove Co., Toledo, Ohio. This Standard model No. 1236 is equipped with all automatic features, and is finished in either white or ivory with marbleized panels or in solid white or colors as desired. It is equipped with four burners, one of which is a speed burner, or, if desired, three burners and a unit cooker. The illustration shows the switch panel doors open revealing the recessed switch panel and plate and food warmer.—ELECTRICAL WEST, March 1, 1932.

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MOBILE COLORS FOR LILY PONDS—A new attraction for the formal or informal garden, hotel grounds, parks, public squares, amusement parks, amphitheaters and similar locations is a small, inexpensive lily-pond electric fountain with mobile colors that has been devised by the illuminating engineering laboratory of the General Electric Co., Schenectady, N. Y. The basin of the three-projector unit can be constructed in any form which harmonizes with the surroundings; the water effects can be adjusted to any desired height; and recirculation of the water conserves the outside supply. Color is provided by submersible floodlight projectors, automatically controlled to provide seven combinations of color in a one-minute cycle.—ELECTRICAL WEST, March 1, 1932.

Cable Manhole Ventilator

Coppus Engineering Corp., Worcester, Mass., has recently brought out a smaller cable manhole ventilator blower, designated as size No. 150 S.M. This ventilator has a capacity of 950 cu.ft. per min. free air, as against 1,500 cu.ft. per min. for the larger size. The new unit, weighing 74 lb., is driven by a ¼-hp., 110- or 220-volt universal motor, operable on a.c. or d.c. The outfit comes complete with a combined switch and circuit breaker, 12 ft. of cord, and plug. It is mounted by vertical swivel on a handy tripod.

By means of a flexible canvas air tube, which can be obtained and attached to the diffuser, the volume of air may be directed where needed.

Developed for ventilating cable manholes, vaults of electric light companies and telephone companies, these blowers are adaptable to many other applications. These include ventilation of sewers under construction, shipholds, tanks, silos and coal bins, confined spaces in chemical plants and oil refineries.—ELECTRICAL WEST, March 1, 1932.

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Illuminometer

An instrument which reads illumination intensities has recently been developed by the Weston Electrical Instrument Corp., Newark, N.J. This device, known as model No. 603 Illuminometer, consists of an indicating instrument and a light target assembled in a portable case. The light target is on the end of a flexible cord so that it may be placed in any position. This light target or searching unit has two photronic cell units which convert light energy directly into electrical energy without the use of batteries or other auxiliary voltage. They maintain constant output over long periods of time and there is no dark current. The output from the photronic cell units is considerable, allowing the use of a rugged portable instrument calibrated directly in foot-candles.

There are three ranges on the instrument, 10, 50 and 250 foot-candles. A range changing switch is provided for the selection of the desired scale. Other combinations of ranges will shortly be added to the line. The light target may be placed at a distance from the observer so that shadows and lights reflecting from light clothing will not cause errors in readings. Light may be read from all angles and the light target may be placed in relatively inaccessible places. The absorption of light by painted walls, screens, draperies, etc., can be measured directly by turning the light target so that it faces the surface.—ELECTRICAL WEST, March 1, 1932.

Frequency Checker

The Hammond central station frequency checker, made by The Hammond Clock Co., 2915 North Western Ave., Chicago, when used together with any type of standard time clock having a second hand, affords a simple means of obtaining an absolute check of the frequency of the central station output, so that time service may be rendered.

In operation, a clear audible single-stroke bell indicates exact five-second intervals as interpreted by the central station frequency, permitting the operator to face the standard time clock directly and uninterruptedly observe its moving second hand for comparison. List price, $40 f.o.b. Chicago.—ELECTRICAL WEST, March 1, 1932.

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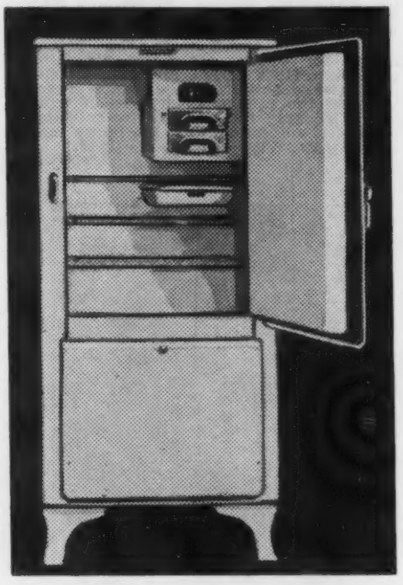


Moler Electric Refrigerator

Moler Manufacturing Co., 321 North Eucalyptus St., Los Angeles, announces a new line of Moler electric refrigerators. This refrigerator is a self-contained unit with a twin cylinder compressor insuring quiet and efficient operation. The model pictured is No. 480, retailing for $199; other models selling at $179, $229, $275, $350 complete the line.

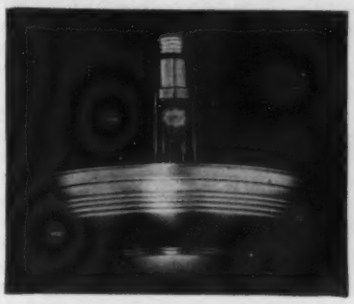
The cabinet is made by Seegar and is constructed of porcelain on steel (porcelain inside and out); Dry-Zero insulation is used and the corners of the compartment are rounded for easy cleaning. Other features of the Moler electric refrigerator are a temperature regulator with eight points of cold control, shelves of convenient height on which bottles or dishes will not tip, broom-high legs for convenient cleaning, heavy chromium-plated hardware and automatic self-locking door latches.—ELECTRICAL WEST, March 1, 1932.

150-watt Indirect Unit

An indirect unit of simple construction which can be retailed at a low price is announced by Silvray Lighting, Inc., New York. The unit employs a 150-watt lamp and is so constructed that a smaller lamp cannot be used.

The unit used serves only to conceal the lamp from view. The lamp has a pure silver mirror covering the bowl as a protection to the eyes. The light is reflected from ceilings and wall giving totally indirect glareless, shadowless illumination.

No installation or wiring is necessary as the unit screws into any ceiling receptacle or suspended socket. It is of all-metal construction, non-tarnishing and finished in pewter.—ELECTRICAL WEST, March 1, 1932.



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Water Heater

Described by its manufacturer as combining the desirable characteristics of both the storage and instantaneous types of heaters is a new electric (Temprite) water heater, brought out by Temprite, Inc., Defiance, Ohio.

The heater is automatic in operation. It consists of a small welded tank of about 1-gal. capacity, surrounded by a heating element which is controlled by a thermostat so that a temperature of any predetermined degree will be maintained continuously. The inner tank is coated with vitreous enamel inside and out and surrounded by a heavy wall of insulation to cut down radiation losses to a negligible point.

The unit is compact, which makes it possible, the manufacturer points out, to have separate hot water supply units for bathroom, kitchen and laundry as the temperature requirements of these three major water needs differ widely. No special wiring is required for the heater, as it can be plugged into any service outlet.— ELECTRICAL WEST, March 1, 1932.

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Okolite Insulation

Okolite insulation has been developed by The Okonite Co., Passaic, N.J., to meet the requirements for a wire and cable insulation which, in addition to possessing the mechanical resiliency and moisture-proof features of a rubber compound, is resistant to corona and heat.

In general, the manufacturer explains, Okolite insulation is adaptable for any insulated wires and cables. In power installations it is especially suitable for single conductor, braided cables in places where moisture, heat or corona conditions exist. With it, a lead sheath can be avoided, the insulating strength of paper or varnished cambric is obtained, and the disadvantages inherent to a rubber insulation are avoided.

Okolite is specifically adaptable for generator cables and for other classes of cables in power stations, switching stations, and substations. It is suitable for submarine cables and is an excellent insulation for underground and aerial power cables. It meets a special need for primary networks where lead sheathed cables are not desired. An obviously appropriate application of Okolite is for high-voltage risers in skyscrapers.—ELECTRICAL WEST, March 1, 1932.

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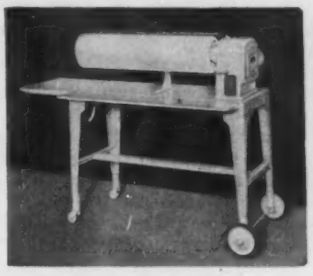

ABC Ironer

Altorfer Bros. Co., Peoria, Ill., has brought out a new model X ABC ironer to retail in the West for $97.50. Mounted on an attractive steel table equipped with two extra leaves, this new ironer weighs only 65 lb. in all, is compact in structure and may easily be moved to the most convenient place for ironing and then rolled out of the way when not in use. The mechanism is entirely sealed in and is lubricated by action of an oil pump of special design.—ELECTRICAL WEST, March 1, 1932.

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Explosion-proof Fittings

A special line of Unilet fittings that meets requirements of the Underwriters' Laboratories for use in hazardous locations is announced by the Appleton Electric Co., 1701 Wellington Ave., Chicago. In these Unilets the body is made of malleable iron and the cover of cast brass. All metal-to-metal joints are machined and no gaskets are required. These fittings can be furnished complete by the manufacturer with either rotary or toggle switches.—ELECTRICAL WEST, March 1, 1932.

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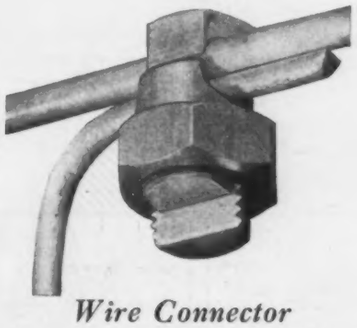

Wire Connector

A new type wire connector that may be easily attached to through wires with one hand has been announced by the W. N. Matthews Corp., St. Louis, Mo. This new connector, known as the "Univise," has only one unit; clamping jaw and nut cannot be removed from the bolt, therefore there are no parts to drop or lose when wires are connected. No cross threading is possible. All parts are made of bronze with 90 per cent copper content.

With the Univise connector 52 per cent of the original bolt is retained. Linemen cannot twist the heads off or cause them to collapse under heavy wrench pressure, and there is no possibility of loose connections causing radio interference and overheating.—ELECTRICAL WEST, March 1, 1932.

Trade Literature

¶ COLOR LIGHTING AND SIGN EQUIPMENT—Reco color lighting equipment, manufactured by Reynolds Electric Co., 2650 West Congress St., Chicago, is fully described in the company's bulletin No. 81. The booklet illustrates a wide variety of applications of color hoods, such as airport lighting, theater lighting, electric signs, marquees, show window lighting, built-in color lighting, colorama, and decorative street lighting effects. Bulletin No. 50, recently released by the Reynolds company, describes the Reco line of motor driven flashers, both mercury and brush types, for electrical displays.

¶ ALUMINUM CONDUCTORS—"Channeluminum Electrical Conductors of Alcoa Aluminum" is the title of a new booklet descriptive of the aluminum conductors made from channel sections manufactured by the Aluminum Co. of America, Pittsburgh, Pa. Photographic illustrations picture actual installations. "Alcoa Aluminum and Its Alloys," another recent publication of this company, gives in concise form information concerning the physical and chemical properties of aluminum alloys. In addition, the book contains tables showing the sizes of the basic commodities the company manufactures from these alloys. Commercial tolerances for various commodities also are given.

¶ POLYPHASE SQUIRREL-CAGE MOTORS—Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo., has issued a loose-leaf bulletin page (bulletin No. 167, part 7) on polyphase squirrel-cage motors. A similar sheet on type RG brush-riding repulsion-induction motors also is being distributed by this corporation.

¶ DIRECT-CURRENT MOTORS—A special bulletin on its type T d.c. motors, ranging in size from 100 hp., 200 r.p.m. to 350 hp., 850 r.p.m., has been issued by The Reliance Electric & Engineering Co., Cleveland, Ohio. The bulletin includes details of construction, cross-sectional drawing, dimensions and table of ratings.

¶ SCHOOL LIGHTING—"The Most Efficient Lighting for Schools and Colleges," is the title of a new publication of The Holophane Co., 342 Madison Ave., New York. The bulletin presents an outline of modern practice in the lighting of educational buildings. An engineering tabulation is given, with all the areas of the school listed, and there is a photograph of the lighted interior for each of these classifications.

¶ CONDUIT FITTINGS—Appleton Electric Co., 1701 Wellington Ave., Chicago, announces its new No. 10 Unilet catalog consisting of 226 pages devoted entirely to the listing of threaded and no-thread malleable Unilets, as well as threaded and no-thread couplings, connectors, etc.

¶ G. E. PUBLICATIONS- Recent publications of the General Electric Co., Schenectady, N. Y., include the following:

GEA-1481B: Electric Hotbeds.
GEA-1438: Automatic Telemetering Equipment.
GEA-1534: Refrigerator Control Unit For Use With Domestic Electric Refrigerators on A.C. Systems.
GEA-1084A: Plate-type Field Rheostats.
GEA-1192A: Galvanized Beam Clamps.
GEA-924B: Indoor Bus Supports.
GEA-1521: Low-temperature Fuse Links for Distribution Cutouts.

Market Review

THOUGH the volume of electrical business in the West is shading a little lower than for last year, yet certain factors promise potential results. They are, first, a better though certainly not an optimistic spirit; second, an increased and better distributed number of smaller jobs; third, a larger proportion of commercial and industrial building as compared with government and other public construction even though totals are poorer; fourth, heavy late rains and a 50 per cent over normal snowfall, which promises plenty of irrigation water and consequently a reasonable expectation for a 100 per cent increase in sales of pumping motors, controls and outfits; fifth, constructive efforts for future business, such as $1,500,000 wharf and warehouse plans for San Francisco harbor; sixth, stricter shepherding of accounts all along the line.

Order values are still shrinking, through price declines and unit of purchase decreases.

Building permit values in California for the first two months this year have shown approximately the same rate of decrease as in 1931 compared with 1930, except in San Francisco, which last year showed a decrease of 5 per cent, and so far this year shows a 60 per cent decrease in volume over last year but only 20 per cent decrease in number of permits. Los Angeles last year showed a 38 per cent decrease, and Oakland a 34 per cent decrease over 1930.

All manufacturers report industrial machinery purchasing to be very quiet but power companies have been adding considerable needed equipment to their lines, such as $45,000 G.E. reactors for station A in San Francisco, $6,000 of regulating transformers each for Wheatland and Sacramento, 4 500-kva. G.E. transformers (value $17,500) for Gridley, 2 300-kva. G.E. network transformers (value $4,500) for Oakland, and G.E. turbine parts (value $15,000) for the Buttonwillow district of the San Joaquin Valley. Purchases of pole line hardware, despite an occasional car of braces, guy clamps, or bolts for central stock, are running less than half of last year, and crossarms and insulators are very slow. Orders for annual pole requirements for the central California area have been placed. The total figure usually runs in excess of $50,000.

Pacific Northwest

Except for the movement of electric ranges, refrigeration and radio, (particularly midget sizes), which is reported as being from fair to good, Seattle electrical jobbers state sales volumes are at absolute minimum although indications, several firms assert, are fairly bright for material increases in sales within the next 60 to 90 days. This assertion is predicated on several facts:

Stocks of transformers and meters of various central stations in Seattle and the Puget Sound district, which are said to be very low, must be replenished; building, which has been hovering around zero for many months, is showing signs of revival, particularly along residence lines, and several pulp and board mills in this district are in the promotional stage with optimism being shown over the completion of successful financing. Lumber mills reporting to the West Coast Lumbermen's Assn., now operating at capacities ranging from 19 to 25 per cent of normal, are sending out inquiries for motors and accessories which are sorely needed, but purchasing from these sources is negligible. Industrial buying, also, is practically nil although one large Seattle firm during February announced pumps and motor sales to municipal water systems and a cold storage plant, the latter in Yakima, approximating $3,000.

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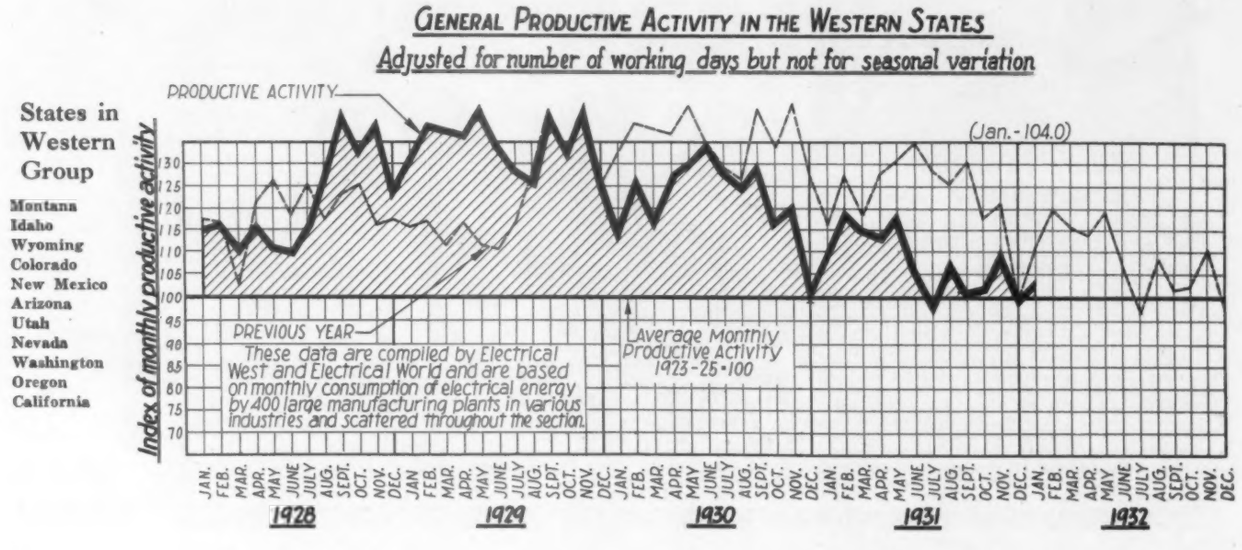
Barometer

FOR the first time in many months indications of an upward turn in industrial activity in the Western states are to be found in the returns of electrical energy consumption compiled by ELECTRICAL WEST and *Electrical World*, although the evidence is not yet conclusive. Present statistics must be supplemented by others to come later before a positive statement will be justified, but there are signs.

In recent years the January index, as computed from those returns, has been decidedly below that of the preceding summer and autumn; this year it is above the average for the last half of 1931. It climbed nearly 6 per cent from the December value.

Indexes of Manufacturing Activity in the Western States

(All figures adjusted for number of working days)

	January, 1932	December, 1931	November, 1931	January, 1931
All industry	104.0	38.3*	110.9*	111.0
Chemicals	92.0	88.3*	98.9*	82.4
Food	129.0	134.4*	149.0*	216.0
Forest products	136.0	124.8*	135.5	136.9
Metals group	45.3	32.7*	46.9	71.6
Paper and pulp	121.0	110.6	122.2	126.0
Rubber	103.7	53.7	68.1	157.0
Shipbuilding	96.7	87.8	98.1	112.9
Stone, clay and glass	83.5	79.9*	112.3	93.8

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